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Architectural Library

THE ARCHITECTURAL FORUM

APRIL 1921

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THE EDITOR'S FORUM

HOSPITAL LIBRARY AND SERVICE BUREAU

WITH the rapid advance in the planning and equipment of specialized types of building, it becomes increasingly difficult for architects to keep in close touch with new developments. In the field of hospital planning there has recently been inaugurated a service which promises to be of great assistance to architects.

This is known as the Hospital Library and Service Bureau and it has been organized by national hospital, public health, social service and other organizations, aided by the Rockefeller Foundation, to serve gratuitously all persons interested in the construction, equipment and operation of hospitals and institutions of like character.

The headquarters is maintained at 22 East Ontario street, Chicago, and the feature of particular interest to architects is the library which will be collected and classified and from which data will be readily available. The classifications of service which will particularly meet architects' requirements are thus made:

(1) Plans, drawings, and other data pertaining to the construction of hospitals, dispensaries, first aid rooms, etc., also follow-up of all new hospitals within one year of their opening for the purpose of appraising efficiency.
(2) Complete record of hospital architects, with lists of hospitals planned by them.
(3) Records of equipment in new hospitals, dispensaries, etc., and a follow-up for the purpose of ascertaining what parts of the equipment proved unnecessary.
(4) Indexes of hospital equipment and supplies, and equipment necessary for certain work, with cost estimates.
(5) Health and hospital literature and reference works on community problems, vital statistics, social service, public health, nursing, legal subjects, new laws and pending legislation affecting hospitals.
(6) Material and data concerning preliminary educational and publicity work incident to the promotion of building and equipment.

SUGGESTION FOR A. I. A. CONVENTION

IN view of the present unsettled conditions of the building industry and the opportunity that the coming national convention of the American Institute presents for a comparison of economic conditions obtaining in the industry, this resolution of the Illinois Chapter has particular importance.

WHEREAS, in the opinion of the Illinois Chapter of the American Institute of Architects, a most remarkable fund of knowledge, experience and information is made available by the convening of the representative architects of the United States in the annual convention of the American Institute of Architects in Washington, and

WHEREAS, the opportunity for the discussion of economic problems of the building industry is seldom so great and so conducive to results,

NOW THEREFORE, BE IT RESOLVED by the Illinois Chapter A. I. A. that it firmly believes that the Board of Directors of the American Institute of Architects should set aside a time or times as a definite part of the program of the convention for a constructive discussion, with its resultant conclusions, upon ways and means to better the highly unsatisfactory economic situation in the building industry,

AND FURTHER, that a time or times in the regular program of the convention should likewise be set aside for discussion of the very commendable and constructive bills now pending before congress under the authorship and guidance of Senator Calder, with a view of formulating suitable resolutions in favor of this proposed legislation.

CAMPAIGN TO AID BUILDING

THE National Federation of Construction Industries has plans under way by which it hopes to bring together manufacturers of material, contractors and workmen to launch a nation-wide campaign by May 1 to encourage building. If such a meeting can be made effective in developing plans that will bring about unity of action, with the sincere intention of eliminating every unnecessary expense entering into the cost of producing materials, and will bring labor to the realization that its contribution must be a fair day's work for a fair day's pay, something tangible may be expected to result from it.

What seems to us a more definite attempt for eliminating waste, and therefore giving greater promise of reducing cost, is the proposal of the Department of the Interior, headed by Secretary Hoover, to work out a unified building code for the benefit of the entire country.

It is well known to all architects whose practice covers a wide territory, that the difference in requirements between one city and another is amazing, and that in this item alone a great deal of waste creeps into building construction. There seems to be no way by which one community can accept the results of investigation in another, and as a consequence there is not only tremendous duplication of investigating but, what is worse, widely differing requirements arbitrarily imposed by local authorities. The formation of a central authority, which would pass upon materials and specify the kinds and strength of construction required for specific types of building, would be an improvement of immense value, and affect economy of construction.

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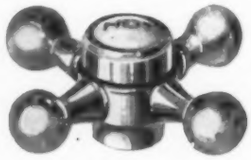

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TOWER OF THE TRAVELERS INSURANCE COMPANY
FROM THE CONNECTICUT RIVER AT HARTFORD

The
ARCHITECTURAL
FORUM

VOLUME XXXIV APRIL 1921 NUMBER 4

Some Recent Work in Hartford, Conn.

By DONN BARBER, ARCHITECT

BUILDING conditions during the past few years have been such as to almost entirely preclude the erection of residence structures of any kind, and a large proportion of such building as has been done has taken the form of structures for the use of certain types of business, and in some instances of buildings for state or municipal uses.

In Hartford, Conn., there have been completed during this period several structures for these purposes, illustrations of which are included here. Business is served in the buildings which have been erected for the Travelers Insurance Co. and *The Hartford Times*, and the massive structure on Capitol avenue serves for the housing of certain departments of the state government; these illustrations show the appearance of this structure in its finally completed form.

STATE LIBRARY AND SUPREME COURT

Near one edge of the extensive grounds of the state capitol at Hartford there has been built the dignified and monumental structure which houses the State Library and the Supreme Court, besides containing a Memorial Hall. The building is T shaped and consists of wings grouped about a central pavilion which has been designed with a three-arch motif, the arches being separated by columns which support an attic story. The exterior walls are of white granite of fine texture and tone, and sloping roofs are covered with copper, while flat roof surfaces are of vitrified tile.

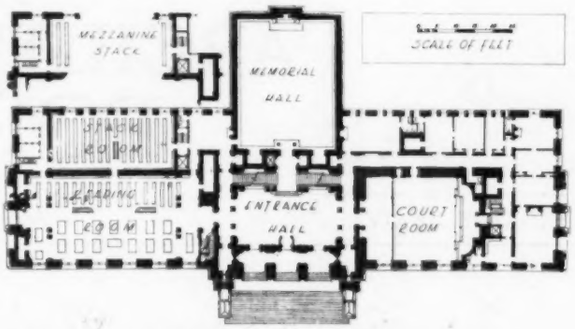
Although not shown on the plan given, the central or main hall, Memorial Hall, the Library reading room and the Supreme Court room extend through both the first and second stories of the building, and thus occupy practically all the available space except in the case of the central hall where, owing to the greater height of the building at this point, there is a large attic area which has been provided with means of communication and access so that in case of future need this space can also be equipped and occupied for public purposes.

The main or first floor upon which are located the main reading room of the State Library, the Memorial Hall and the court room and principal offices of the Supreme Court, is reached at the middle of

General View of State Library and Supreme Court

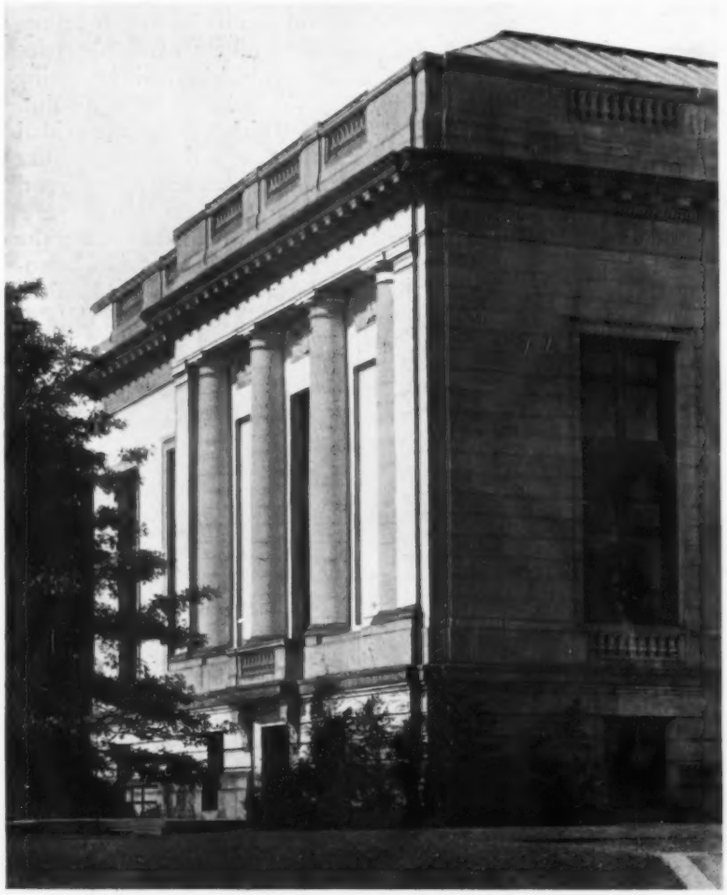
the Capitol avenue front by a broad flight of granite steps, leading between large columns and across a vaulted porch to three doorways which open immediately into the large central or main hall which forms the center of the general plan. This is a large room with barrel vaulted ceiling formed of richly coffered paneling. This ceiling starts from a cornice which is carried by massive columns and pilasters. The entire floor of this hall, together with the entire wall surfaces from the floor to the top of the cornice, including the columns, pilasters and gallery railings, is executed in marble of buff color. The coffered ceiling has been executed in plaster decorated in color. The ceilings above the galleries overlooking this hall are also formed of decorated plaster and supported upon marble arches. The gallery at the south of the hall overlooks Memorial Hall.

Located at the east or left of this central hall and opening from it is the main reading room of the State Library. Located at the right, or west, and opening from it is the Supreme Court room and its several departments, and adjoining on the south, directly opposite the main entrance but beyond the main stairway, is placed the Memorial Hall.



Main Floor Plan, State Library and Supreme Court

The Supreme Court, as already said, occupies the west wing of the building. South of the court room but separated from it by a wide corridor which opens into the central hall are the lawyers' retiring room, and offices of the messengers, clerks and reporters and the suite of the chief justice, with suitable vaults. Beyond the court room to the west is the consultation room for the judges. The interior of the Supreme Court room is wainscoted in paneled oak of rich design for a height of eight feet above the floor. The walls from this wainscoting to the frieze are finished in artificial Caen stone with simple wall surfaces and richly decorated cornice. Above this cornice is a deep frieze treated as a part of the ceiling of the room and executed in richly paneled and decorated plaster treated with color.



Detail of Library Wing, State Library and Supreme Court

It has long been considered almost impossible to combine in one large room a library, a portrait gallery and a museum, and have them all successful. One seems to be always subservient to the others. In this building provision has been made in the Memorial Hall for the proper hanging of the portraits of the governors, Gilbert Stuart's portrait of Washington, and the display of the old charter. This new arrangement will not only make it possible for portraits to be properly hung and lighted, but will exclude noise and confusion from the Library.

The walls of the Memorial Hall are covered with oak wainscoting forming a dado up to the height of the usual picture railing, above which to the under side of the cornice the walls are hung with woven material as a background for paintings. Above the cornice a wide cove, which is broken by penetrations on all sides, reaches to the ceiling. These penetrations form effective

places for the display of special memorials. There are no windows in this room, which is amply lighted by means of a ceiling light with a skylight above, forming the entire ceiling of the room within the limits of the cove. The electric lights for illuminating this room at night are placed above the ceiling and so arranged as to faithfully produce the effect of daylight, while the lamps themselves will not be visible from any point.

The cornice and coved ceiling of Memorial Hall are executed in richly decorated plaster treated in subdued colors. At the far end of the room, directly facing the entrance from the central hall, a large alcove or niche is formed, in which is placed, upon a raised dais, the special vault containing Connecticut's historic charter. Above this is hung the Stuart portrait of Washington. The floor of this room is of decorative tile. The ground floor below this hall is occupied by the packing room, repair shop and bindery, general store room and locker room of the Library which are easily reached by the service elevator and stairs adjoining.

Entrance to Record and Newspaper Rooms of State Library

As the State Library, Supreme Court apartments and Memorial Hall are conveniently grouped about the central hall, so also are the several departments of the Library conveniently grouped around the main reading room. Along the south side of this room are placed the two-story steel stacks with open shelves for the accommodation of the law library and general works of reference. The rest of the floor space is occupied by the special study and reference tables, with catalog cases conveniently located for service.

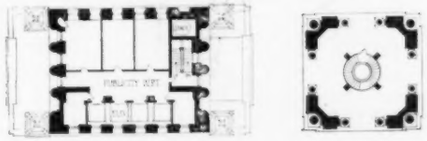
The interior of the main reading room is treated in the same manner and in style harmonious with the Supreme Court room, except that all of the available wall surfaces in this room for the height of 14 feet are here covered with steel bookcases and steel wainscoting. The reading room is equipped with fireproof furniture. In the treatment of this room it has been planned to eliminate the use of wood.

Conveniently located near this main reading room are the librarian's office, the main stack room, the special study and stenographers' rooms, the special vaults for the accommodation of archives, records, valuable papers and special collections, the newspaper room, and rooms for cataloging, repairing, packing and storage.

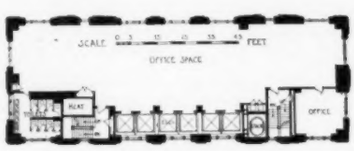
Opening from the main room on the south, just west of the stack room, is the librarian's office directly connected with the main reading room, stack room, Memorial Hall and central hall, all of which are on the ground floor, and by means of the adjoining stairs and service elevator having communication with the cataloging rooms and galleries above and with the several departments on the floor below. Located immediately under the main reading room and connected with it by a special stairway are the record and newspaper rooms.

THE TRAVELERS INSURANCE COMPANY

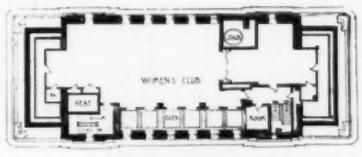
The structure of great height which is visible for miles in any direction from Hartford is the home office or headquarters of the Travelers Insurance Co. In addition to providing office space,



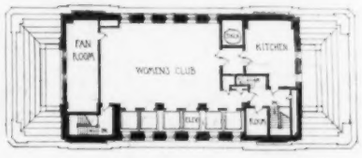
Twenty-third and Twenty-seventh Floors



Eighteenth Floor Plan



Twentieth Floor Plan



Twenty-first Floor Plan

Building for the Travelers Insurance Company

arranged with great efficiency and with direct reference to the requirements of the particular purpose in view, the building by reason of its great size and strikingly original design possesses advertising or publicity features which are of considerable value to its owners.

The building has grown gradually and has been developed to keep pace with the growth of the clerical force and official personnel. These forces numbered 482 when the north wing of the building was constructed in 1907, and 955 in 1913 when the south wing and the Main street front were finished, while at present, with the extension of the south wing to Prospect street and the construction of the tower over it, the home office accommodates a staff which numbers 4,000.

Detail over Entrance Portico of *The Hartford Times*

Designed in a free adaptation of the renaissance, the building combines consistent simplicity in its scheme with dignity and unity in its expression, massive proportions and boldness of detail. The building is of composite construction, consisting of a framework of steel bearing an anchored covering of stone and brick. The exterior walls are built of pink Westerly granite and the inner walls, which face upon various interior courts, are of light colored brick. It is interesting to note that the quarries at Westerly, Rhode Island, from which the granite was procured, were first developed by James G. Batterson who also founded the Travelers Insurance Co.

Architecturally speaking, the first three floors of the building constitute a base for the next floors, the 4th to 8th inclusive, which unite to form one architectural feature; the 9th is treated as a frieze carrying the massive copper cornice, above which is a 10th floor, set back somewhat from the front and but slightly visible from the street. With these ten stories as a base there soars into space the great tower, an impressive and monumental structure 34 stories in height. The top of the lantern is 527 feet above the sidewalk, a height exceeded by but few buildings in the world. Up to the 15th floor the tower maintains the architectural lines of the main building; the 16th story is treated as a horizontal band, while the 17th and 18th are developed as an arcaded motif.

Building for *The Hartford Times* by Night

Above the 20th floor the tower is set back on its long dimension and three stories serve as a base for the Ionic colonnade which extends through the 25th story; above the colonnade the tower recedes to form a square which is finished symmetrically on all sides. At the 27th floor a loggia is developed, 359 feet above the street, the four corners of the roof being supported by piers and free Doric columns. Upon each side the balcony is formed by a Palladian arch and a balustrade. The roof of the loggia is pyramidal, sloping to a second lookout just below the cupola. Up to this point the entire tower

is of stone, but the cupola is of metal. The lower portion of the cupola is utilized as an outlet for the smokestack and the upper portion, built to form the crowning feature of the structure, supports a finial with a cluster of metal balls varying in diameter from 4 to 20 inches. This cupola or lantern which is 81 feet high is of copper covered with gold leaf. Under the cupola, at the 34th story level, there is a beacon consisting of 44 projectors of from 200 to 400-watt power, throwing a solid band of white light which is visible for many miles.

Looked at from the east or west the tower appears quite slender, while from the north or south it shows considerable breadth—a great white cliff, studded with windows and surmounted by a series of classic building units of diminishing size, rising successively in agreeable composition. The narrower face of the tower assumes approximately the proportions of a Corinthian column; that is, the ratio of its width to its height is about 1 to 10½. The corresponding ratio is 1 to 11 in the Washington Monument, and in the campanile of St. Mark's it is about 1 to 9. The accuracy of the Travelers tower, built for utility as well as for beauty, is thus emphasized. The tower is filled with offices up to and including the 24th floor.

BUILDING FOR *THE HARTFORD TIMES*

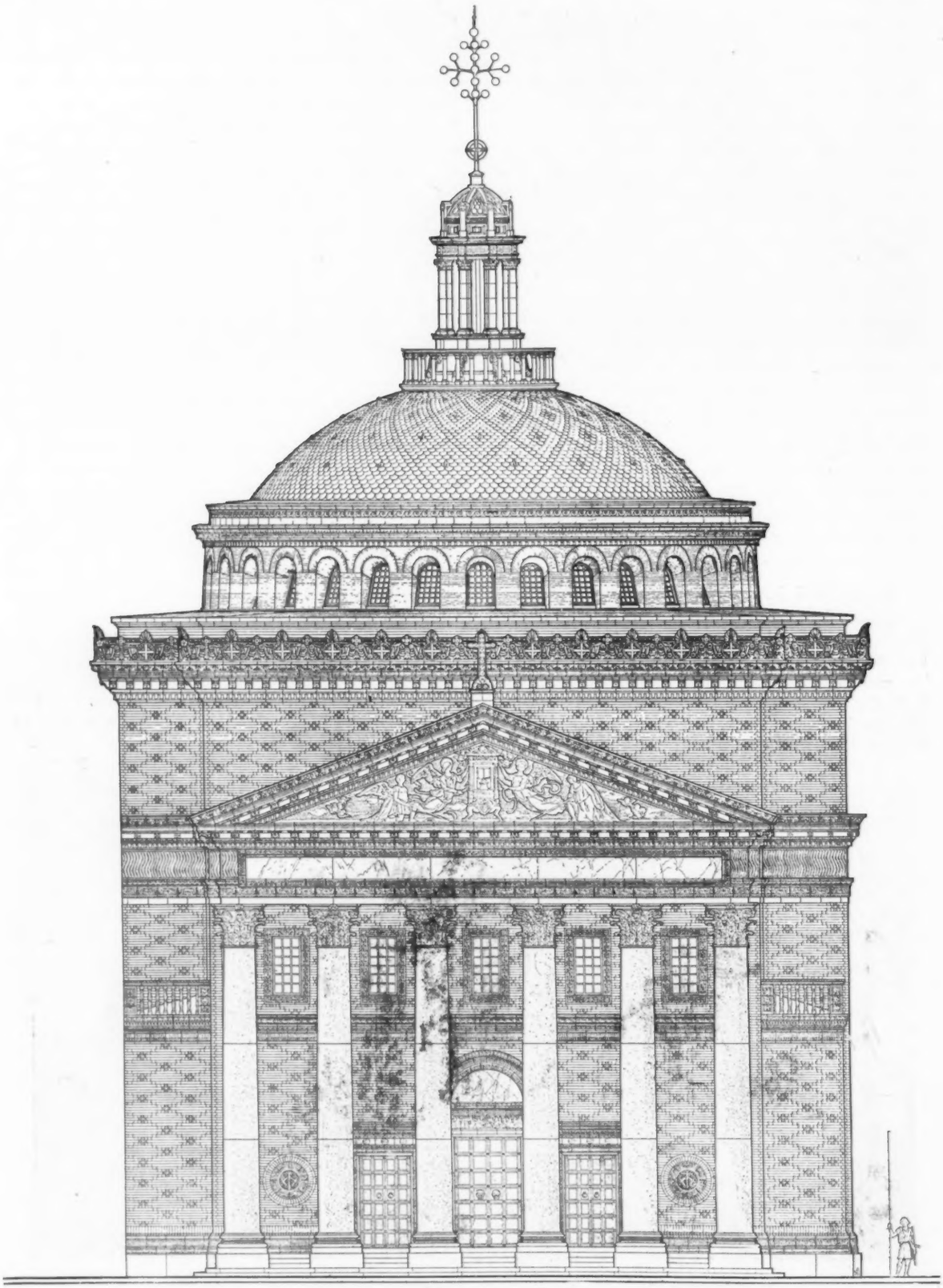
Another instance of successful designing done in this office is the building of *The Hartford Times*. The planning of this structure, and the interesting use of terra cotta detail and other material from the dismantled Madison Square Presbyterian Church in New York, were described in THE FORUM for April, 1920 and the illustrations included here merely prove anew the success with which this material has been adapted.

As has already been noted, the *Times* building is placed at the end of New Atheneum street and the building is seen at the end of this short street between the long facades of the Morgan Memorial at the left and the Municipal Building at the right. Both these neighboring structures are of very moderate height and the *Times* building is of much the same height so that the water table lines and the balustrade motifs of all three buildings are in agreement.

In this newer building has been included the greater part of the exterior material from the church; the columns, pilasters and cornices have been used, and also the steps, platforms and base courses, fitted together as placed originally, excepting for a change in the positions of the pilasters. It was necessary that a colonnade motif of seven bays be used instead of a porch motif of five. The large, circular headed windows which lighted the church upon the 24th street side are now used to form the entrance doors within the arcade, and the windows which were behind the columns on the Madison avenue facade, together with the two side doors which led into the vestibule of the church, appear within the arcade.

It was found to be impossible to adapt, for this newer building, the richly wrought terra cotta Corinthian capitals which were so notable a detail of the church, and new Ionic capitals have been used instead. The pediment and two circular windows which also contributed so largely to the splendor of the church have been utilized in another building, which is described elsewhere in this issue of THE FORUM.

The Newspaper Plant which Includes Material from the Notable Dr. Parkhurst Church



WEST ELEVATION, MADISON SQUARE PRESBYTERIAN CHURCH, NEW YORK
McKIM, MEAD & WHITE, ARCHITECTS

An Outdoor Exhibit at the Metropolitan Museum of Art

PEDIMENT OF THE MADISON SQUARE PRESBYTERIAN CHURCH

By EDWARD H. PUTNAM

THE preservation of an example of modern architectural art by the Metropolitan Museum establishes a precedent that, if followed with judgment, should prove to be of great interest. There are several small wings on the Central Park side of the building, built of brick and severely plain, since it is intended that future additions shall entirely conceal them. Of course integral parts of complete designs would not be consistent in such a setting, but it cannot be denied that they would add material beauty to the buildings, if beautiful in themselves, and a plain brick background, which makes no architectural pretense, is the safest setting that could be found.

Two years ago the Madison Square Presbyterian Church was taken down; wrecked is not the word. The marble columns, the beautiful polychrome terra cotta capitals, jambs, lintels, cornice frieze and pediment panel, even the specially made brick were taken down carefully by hand. Instead of chuting the material into a waiting wagon to be sold second hand or for junk—as is the case with too many demolished buildings—the marble columns and most of the other exterior details were used on an important secular building in New England, the door jambs and lintels were taken by Mr. Lawrence White for his Long Island home, and the terra cotta faience pediment panel and two circular windows of reticulated terra cotta have been set in one wall of the library wing of the Metropolitan Museum, the wall having been increased in width to accommodate the three details. There the panels will remain for generations to come, an enduring memorial to Stanford White, and an example of much that is best in American ecclesiastical architecture.

The Three Details as They Appear on the Library Wing

Probably the genius of Mr. White was never better expressed than in the design of the Madison Square Presbyterian Church. Standing in a busy commercial district and overshadowed by the Metropolitan Tower—the second highest building in New York—the church seemed to fit its setting, belonged where it was placed, and its individuality impressed itself on the passerby. Its design and its color gave it a prominence that could not be denied. It is unfortunate that such a novel and successful example of architecture should have outgrown its usefulness, but in the city's northward march the location became inaccessible to the members of the church's congregation, and its end was inevitable. At the request of the original donor the trustees of the church presented the panel to the Metropolitan Museum, so that its preservation might be assured.

The Madison Square Presbyterian Church was the first important instance of the use of polychrome terra cotta in this country, and as such it marked the revival of an art that died with the Della Robbias. In the hands of Mr. White it was a complete success, and although polychrome has come into increasing vogue of late years, it is doubtful if the success with which it was used here will ever be surpassed. The plan of the pediment panel, the dominant feature of the church, was originated by Mr. White, designed by H. Siddons Mowbray, modeled by Adolph A. Weinman and executed in polychrome terra cotta. The figures are in cream white against a background of blue. In the base and cornice that surround the panel, the major color is dark yellow enlivened with blue, sienna and green.

A word might be added regarding the two circular window grilles of terra cotta, since their use within the portico of the church formed one of the most interesting details of a highly distinguished building. While open work, or reticulation, of terra cotta can hardly be regarded as unique or even unusual, it is only rarely that it attains a result as successful as was secured in this instance. The pale gray of the terra cotta, with its richly intricate Byzantine design backed by sheets of iridescent glass, formed a notable detail which, in its original setting, was readily appreciated as it was placed upon the eye level.

The Portico of the Madison Square Presbyterian Church
Showing Original Setting of the Pediment

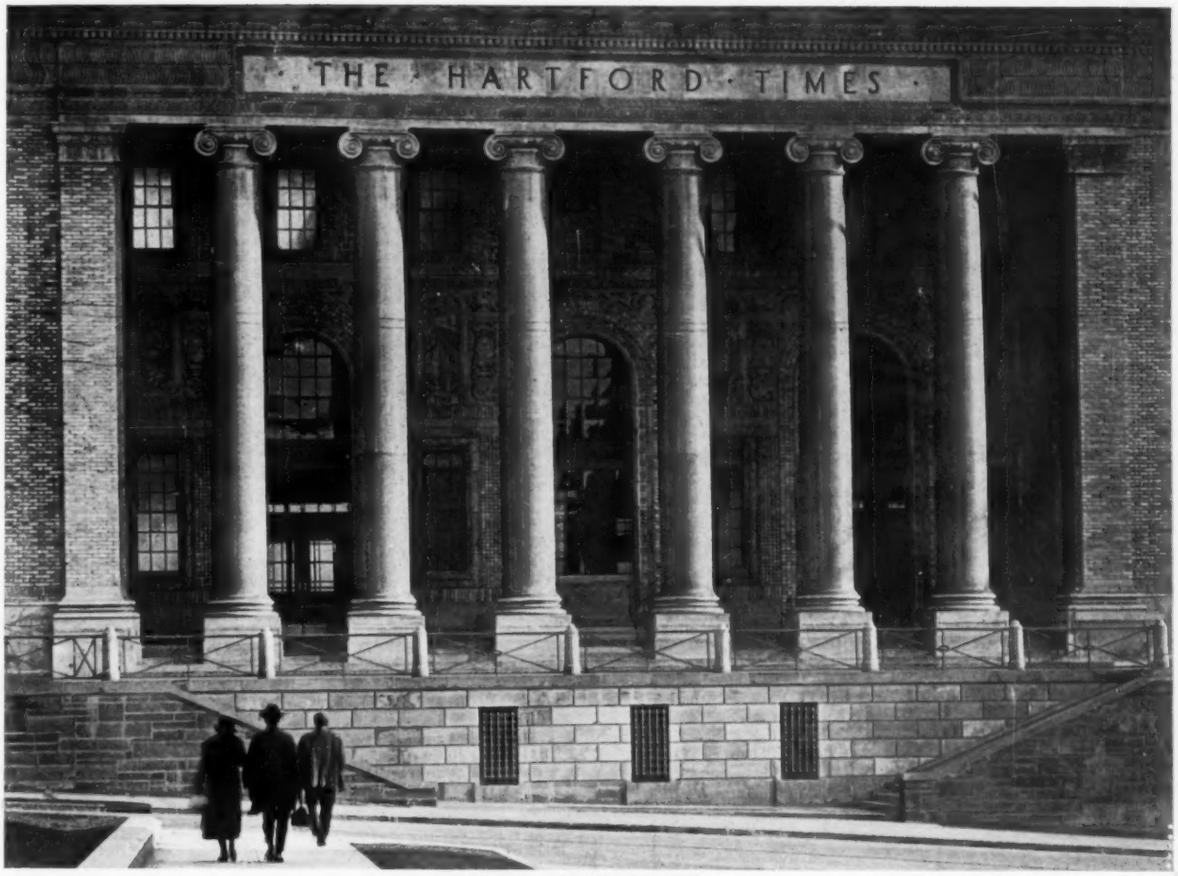
Royal Cortissoz in the *New York Tribune* thus describes the pediment:

"The decoration has for its subject 'The Adoration of the Shrine of Truth.' The central shrine or tabernacle is supported by angels with harp and scroll, and these angels who, with the cherubim placed at different points in the composition, chant the praises of God, are symbolical of religious song and word. The knight on the right of the shrine represents the Church Militant. In the same position on the opposite side is a shepherd whose meaning is equally obvious, and the two together illustrate the equality of the mighty and the humble. The sun and moon are also indicated against the starry blue background. The idea embodied in this decoration is very beautiful and it has been developed with remarkable grace and skill. Both in its linear qualities and in the play of subtle modulation which belongs to a work in relief, the sculpture is free and even picturesque, yet kept well in hand, so that the final impression received is one of suave delicacy." Such is the pediment now permanently placed.

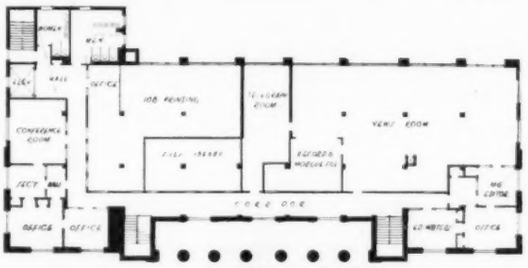
PORTICO ON MAIN FACADE

BUILDING FOR *THE HARTFORD TIMES*, HARTFORD, CONN

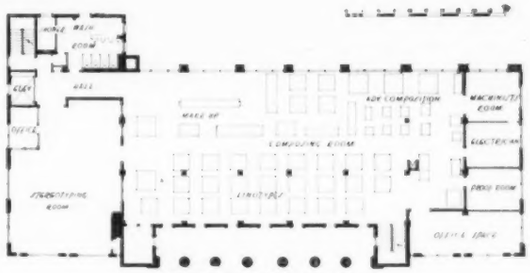
DONN BARBER, ARCHITECT



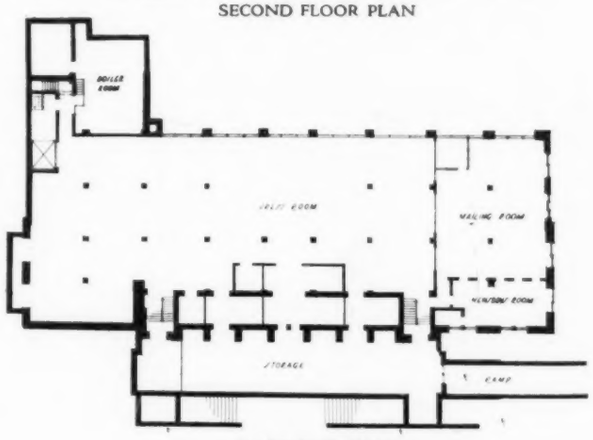
DETAIL OF MAIN FACADE



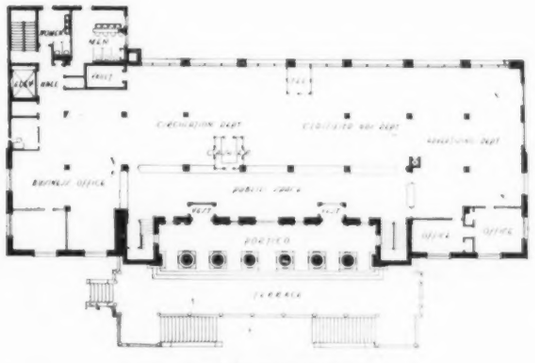
SECOND FLOOR PLAN



THIRD FLOOR PLAN



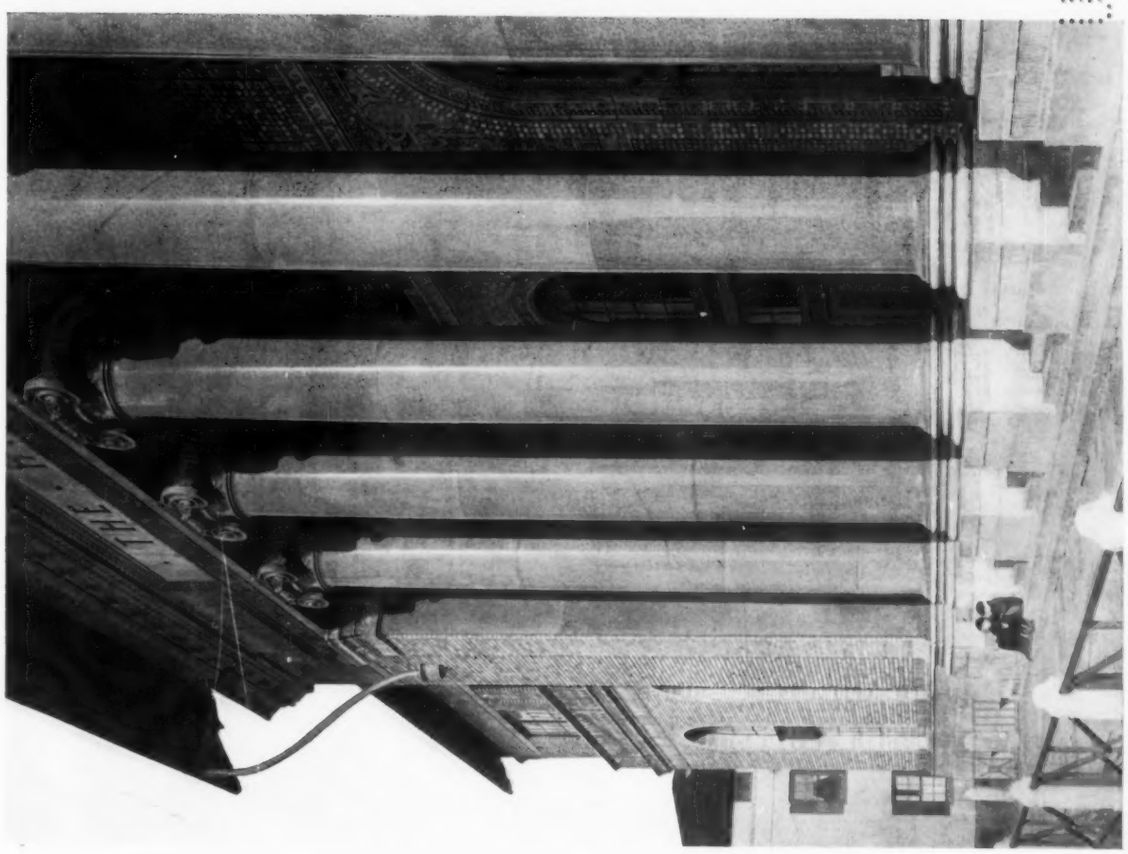
BASEMENT PLAN

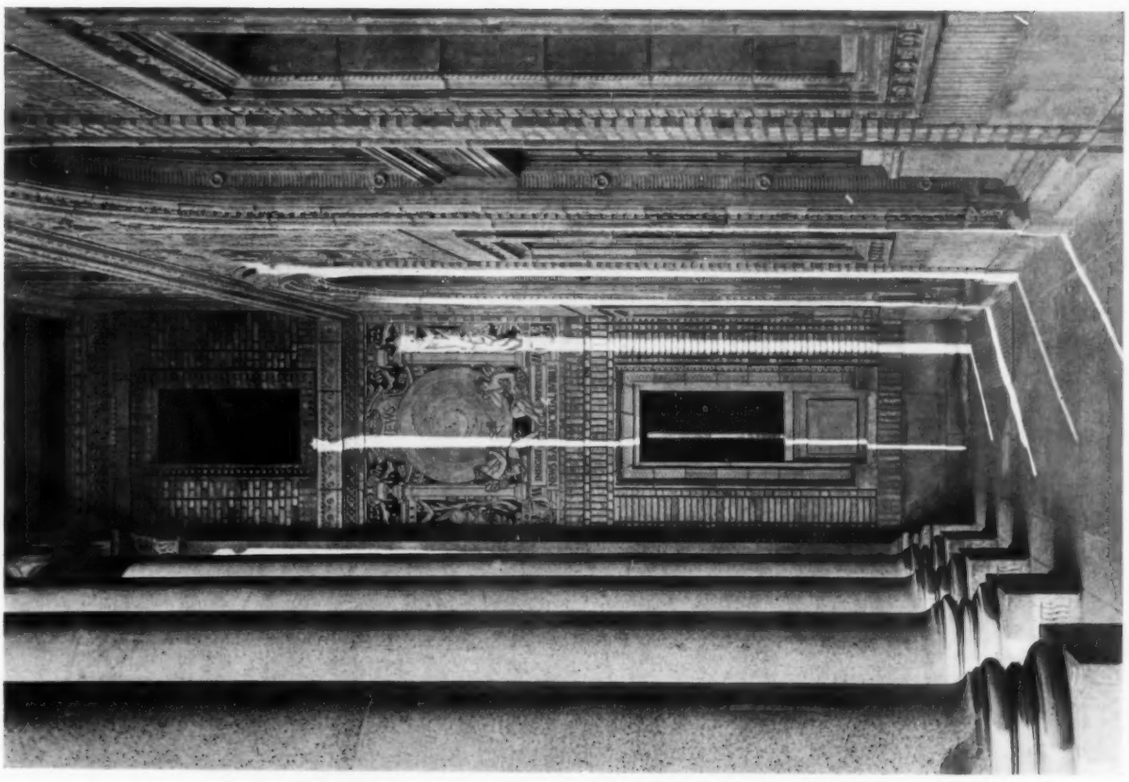


FIRST FLOOR PLAN

BUILDING FOR *THE HARTFORD TIMES*, HARTFORD, CONN.

DONN BARBER, ARCHITECT





DETAILS OF ENTRANCE PORTICO

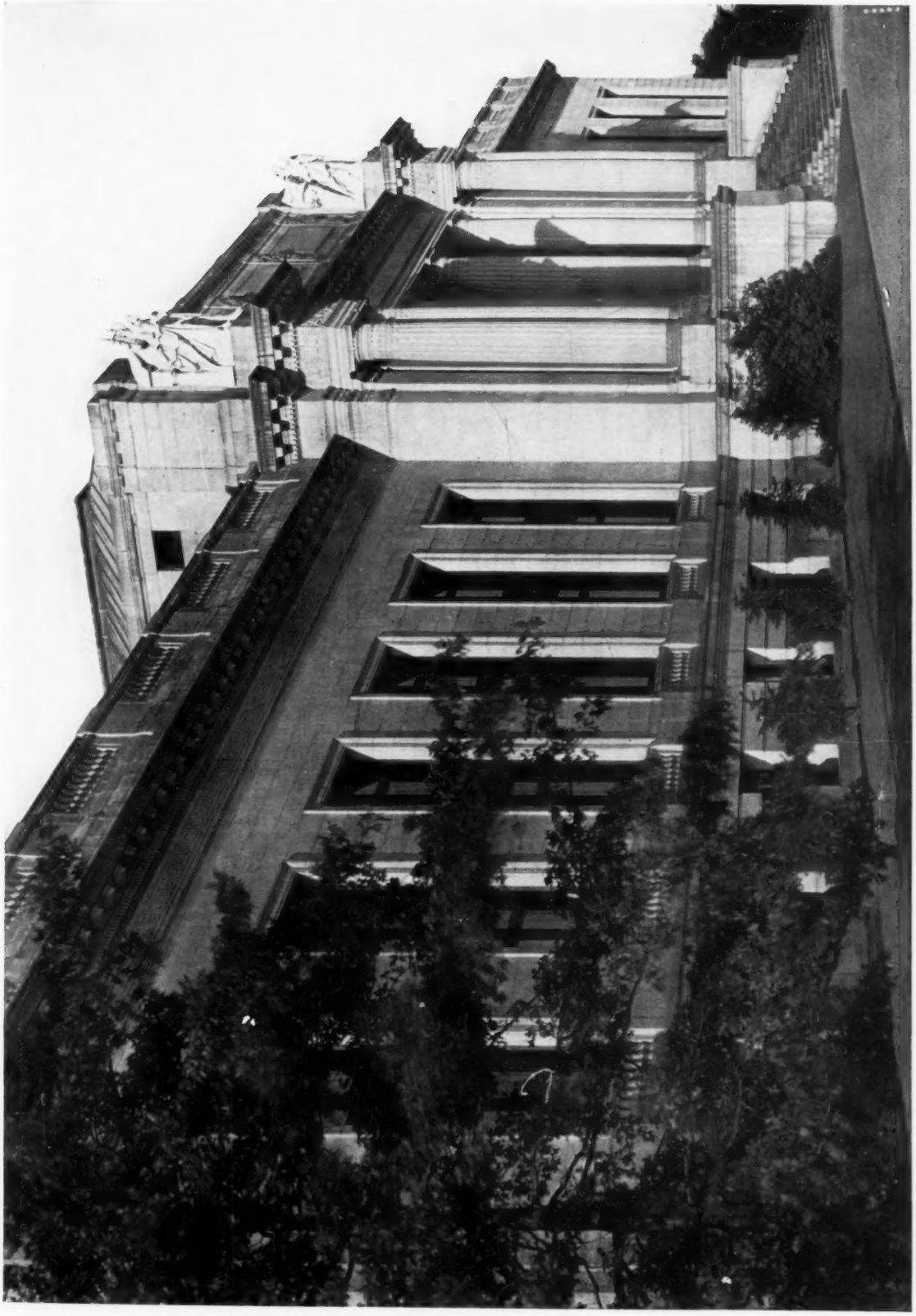
BUILDING FOR *THE HARTFORD TIMES*, HARTFORD, CONN.

DONN BARBER, ARCHITECT

VIEW OF TOWER

BUILDING FOR THE TRAVELERS INSURANCE COMPANY, HARTFORD, CONN

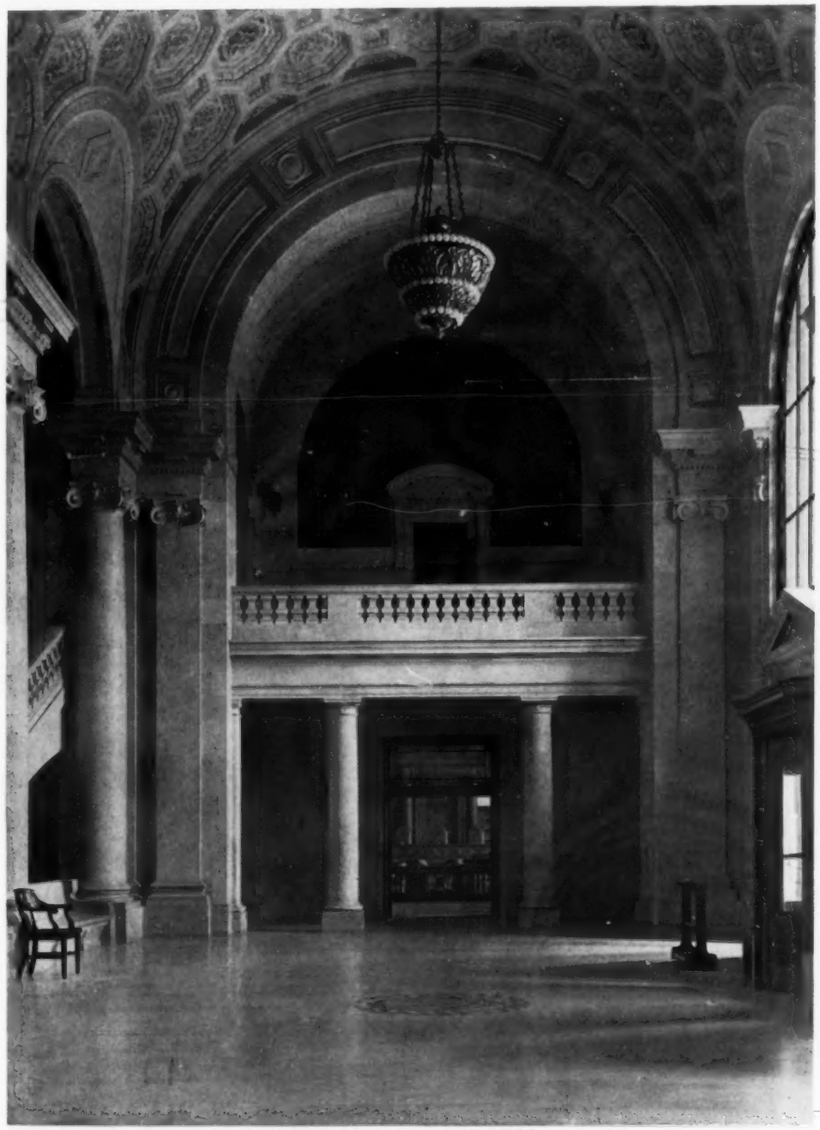
DONN BARBER, ARCHITECT



GENERAL VIEW

CONNECTICUT STATE LIBRARY AND SUPREME COURT BUILDING, HARTFORD, CONN

DONN BARBER, ARCHITECT

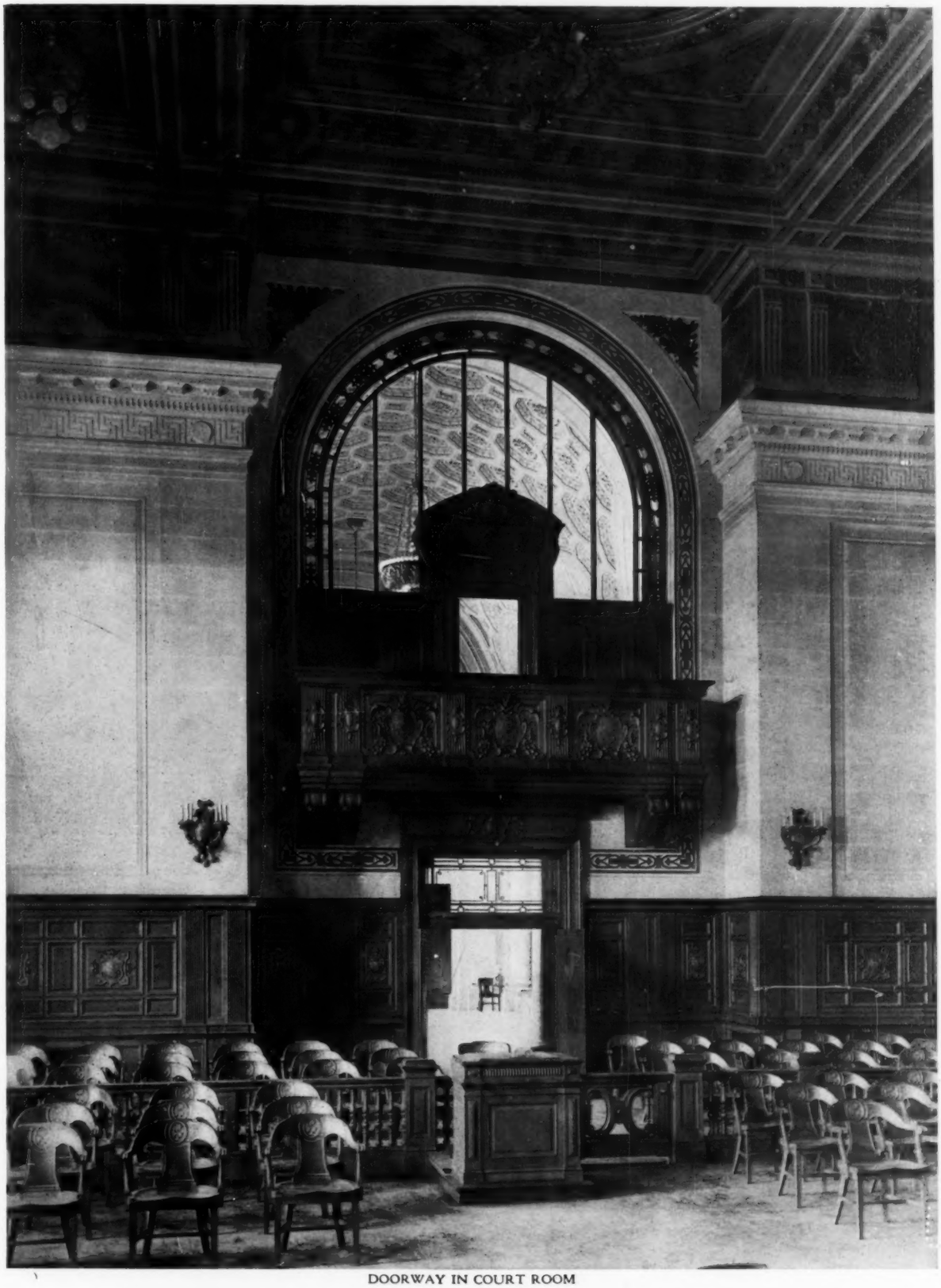


DETAIL OF ENTRANCE HALL

DETAIL OF COURT ROOM

CONNECTICUT STATE LIBRARY AND SUPREME COURT BUILDING, HARTFORD, CONN.

DONN BARBER, ARCHITECT

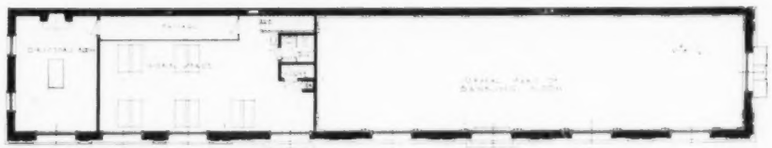


DOORWAY IN COURT ROOM

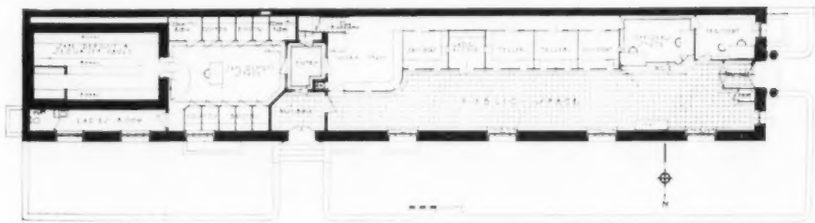
CONNECTICUT STATE LIBRARY AND SUPREME COURT BUILDING, HARTFORD, CONN

DONN BARBER, ARCHITECT

GENERAL VIEW



MEZZANINE FLOOR PLAN

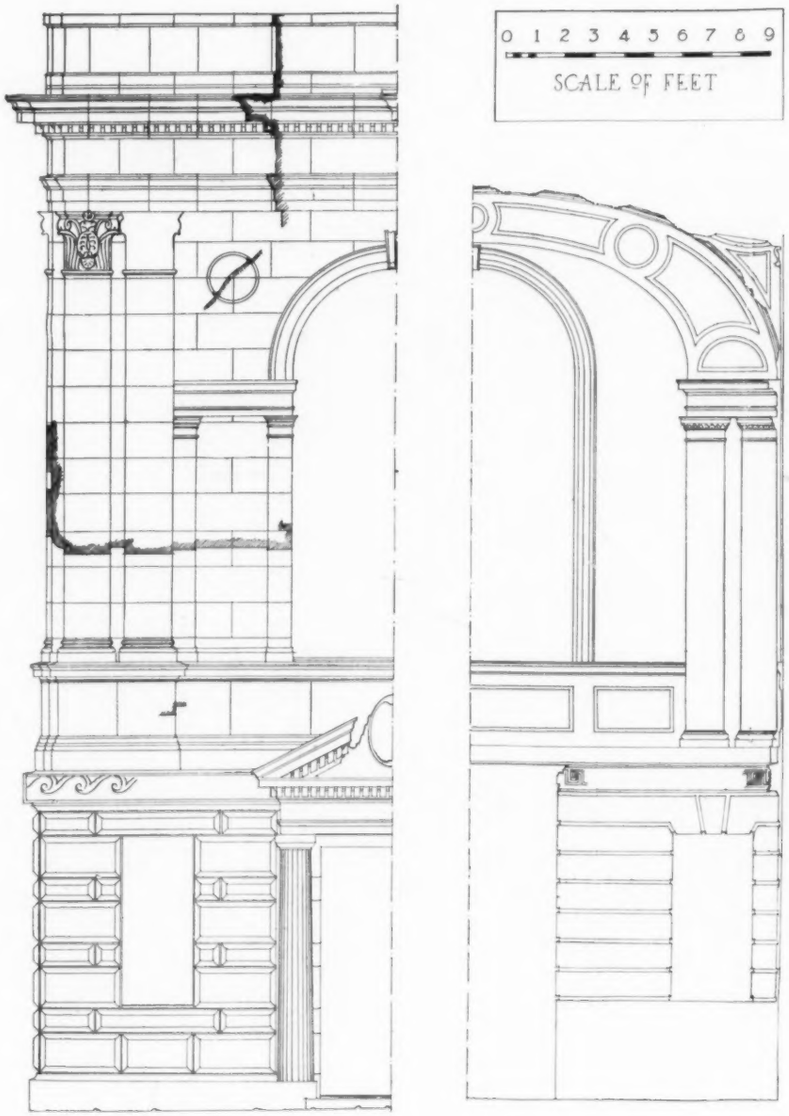


FIRST FLOOR PLAN

VIEW OF BANKING ROOM

LIBERTY NATIONAL BANK, WASHINGTON, D. C.

HOLMES & WINSLOW, ARCHITECTS



EXTERIOR AND INTERIOR DETAILS OF FRONT WALL

VIEW OF MAIN FACADE

LIBERTY NATIONAL BANK, WASHINGTON, D. C.

HOLMES & WINSLOW, ARCHITECTS

The Central Manufacturing District, Chicago, Ill.

PART I. GENERAL FEATURES OF OPERATION

By S. SCOTT JOY, ARCHITECT

WITH the growth of Chicago, and the development of various industries, there has come the necessity of opening up new districts for the use of business. In Chicago there is endless opportunity for such growth, for in three directions there exists boundless area, much of which is adapted for such uses.

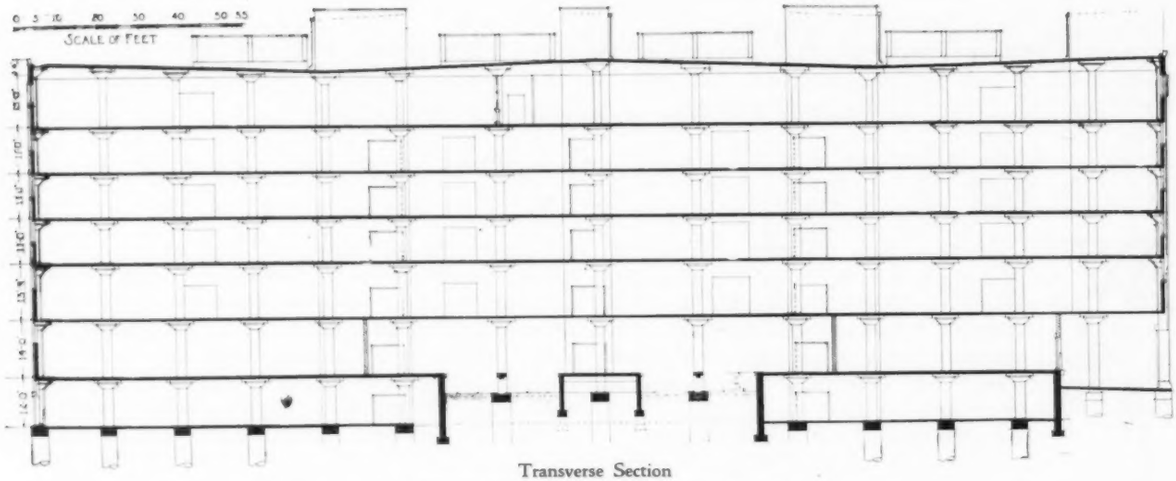
The Central Manufacturing District owes its inception to the expansion of the Chicago Junction Railway. This railway is of the type commonly known as an "inner belt line" and connects directly with all the railroads entering Chicago, having been built originally to serve the Union Stock Yards and the packing industries. After a growth of some years, however, the Packingtown and Stock Yards districts were fully occupied and it became necessary for the Chicago Junction Railway to seek the development of other districts which would contribute tonnage and allow the railroad's growth to continue.

Just to the north of the Union Stock Yards lay a tract of some 300 acres which was unimproved and, with the exception of a few dilapidated lumber yards scattered along the South Branch of the Chicago River, was devoted to the cultivation of cabbages. It was an uninviting prospect and a keenly prophetic vision was necessary to see in it a future which would make justifiable the tremendous effort necessary to put it into attractive condition. However, the farsighted men who were guiding the interests of the Chicago Junction Railway had the requisite degree of confidence in Chicago's industrial growth and were prepared for the test of this idea. Accordingly, there was bought practically all of the land lying between Morgan street and Ashland avenue and stretching from 35th street south to 39th street.

The acquisition of this property dates from 1902. It was purchased outright from the various holding interests by men who were likewise financially interested in the Chicago Junction Railway and Union Stock Yard & Transit Company. In 1908 active development of the Central Manufacturing District was begun. Many thousands of dollars were expended on improvements which included pavements and sewers. Industries began to drift into the District, slowly at first but increasing in number, until at present it accommodates a total of some 200 industrial residents.

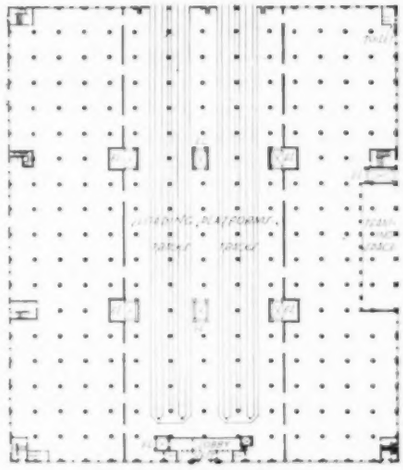
To the south and west of the Central Manu-

The Montgomery Ward & Company Warehouse



Transverse Section

facturing District lay another tract of waste land, about 100 acres in extent, stretching west from Ashland avenue to Western avenue and south from 39th street to the branch of the Chicago River generally known as Bubbly Creek. In 1916 the trustees controlling the development, having acquired this acreage, proceeded with its improvement. Bubbly Creek, which for years had been an eyesore to Chicago, was filled and replaced by a large sewer line, thus increasing the value of the land, and



Ground Floor Plan of One Unit

making it desirable as an industrial location with direct connections to the Ashland avenue yard of the Chicago Junction Railway.

Most of the buildings which house these industries have been erected since active development was started. The total cost of improvements and building operations amounts approximately to $30,000,000. Of this large figure $18,000,000 represents the aggregate expenditures by the trustees to cover the making of streets, erection of buildings and other

U. S. Army Supply Depot before Construction of Third Block

improvements for industries under various agreements which have been made.

The value of the location depends chiefly upon excellent transportation. Each building has its own switch track. This track need not be utilized only for carload shipments; on the contrary, less than carload shipments may be loaded at the very door of a factory building and thus the necessity for vehicle transportation either wholly obviated or greatly reduced. This is accomplished through the agencies of union freight stations and trap car service. Freight loaded out is dispatched the same day, carloads for the respective carriers being extracted from the station settings by their own locomotives. All inbound freight and carloads inbound are handled to and from industries at the through Chicago rate. The Chicago Junction Railway method is peculiar in that each day is a time unit to itself. Each day's business is handled during that day and the next begins a clean slate. Efficiency and system make possible the entire clearing of the congestion in the freight yards once every 24 hours; in this way the accumulation of shipping is impossible. This is due to the fact that the carrying facilities are controlled by the District authorities, which means that transportation problems are so handled that delay and friction are unknown by District manufacturers.

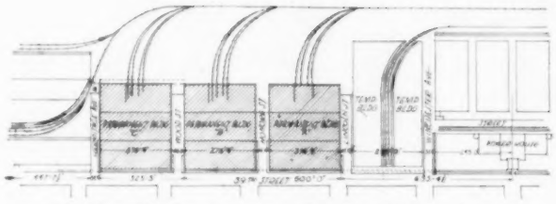
Aside from its unusual advantages in the way of railroad facilities, the District is fortunate in its being within a convenient distance of residence neighborhoods which are suitable for the homes of the vast number of employes needed for such a business development. Within 4 miles from the center

Wall Sections and Detail of End Bays. U. S. Army Supply Depot

of the Central Manufacturing District dwell somewhere between 1,000,000 and 1,500,000 people. A recent survey has proved that of this number about 40 per cent are male adults and 36 per cent female adults. Something like 52 per cent are Americans and the remainder are variously proportioned between a dozen other races. These workers can reach the District by through or cross-town lines on several streets.

The District offers a variety of community features. It is served by a bank under state supervision, which is one of the most complete outside of the Chicago loop. There is a club in which District residents have membership and which has all the attractions of any similar organization. In the District are branch offices of the express and telegraph companies, which give immediate service. The District surgeon and his staff are fully equipped to take care of workers who suffer accidents, and an ambulance is in readiness for use, if necessary, at any hour of the day. There is supported a traffic bureau the duties of which are to aid shippers and to help in the solving of traffic problems.

The matter of financial agreements between the management and industries locating in the District is, of course, of great importance. Several forms of contract, varying in nature, have been adopted so that to each individual industry can be submitted the plan which it and the trustees consider most favorable. Some industries are fully prepared to take care of their own finances and prefer to buy outright. Others, which have no financial reserves established, prefer a long term lease arrangement with the privilege of an option on their property. The trustees fully appreciate the problems of young and growing industries and are generous in their terms with them.

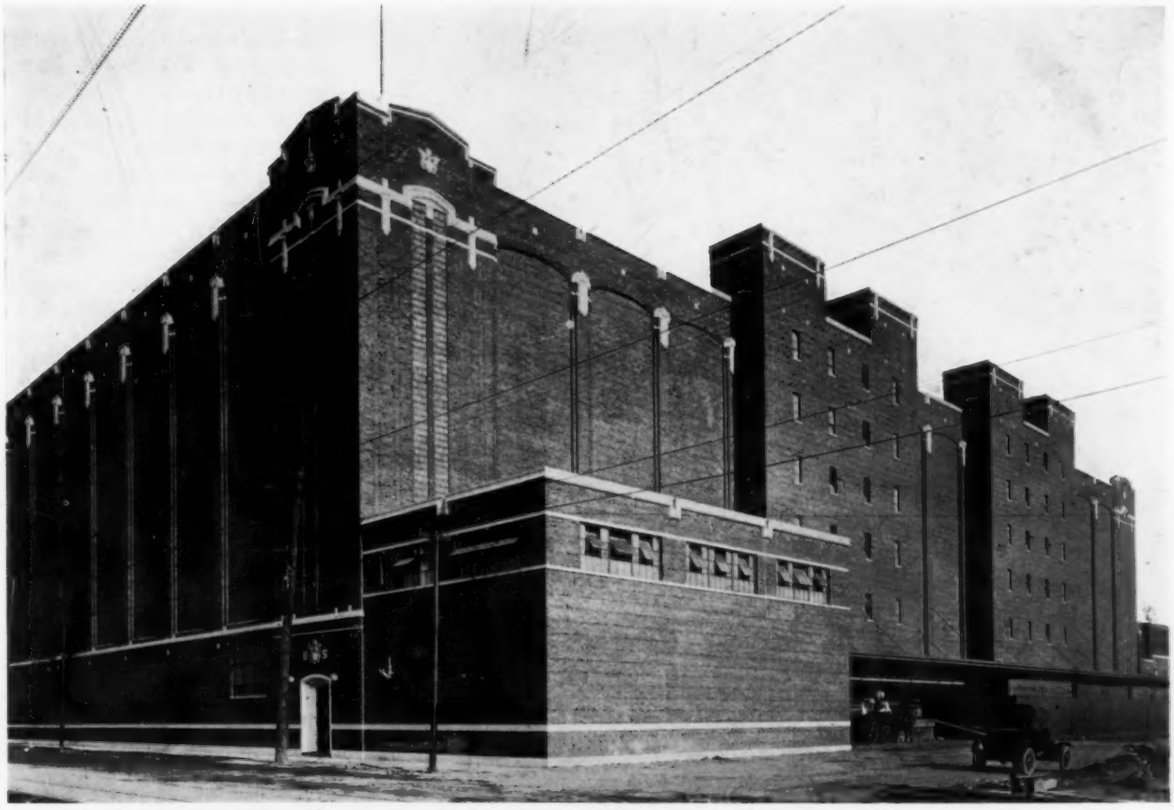


Plot Plan Showing Location of Present Three Blocks of Army Supply Depot

There are three financial arrangements which cover all requirements well. The trustees will sell the land outright and erect a suitable building for an industry, or they will lease the ground and erect a building, and the industry then has to pay the charges in the form of annual rent for 25 years, the period for which the lease is written, this rent being figured on a basis of 6 per cent on the value of the ground and 9 per cent on the value of the buildings and improvements. Probably the most popular form of agreement is what is known as the "Contract of Purchase." Under this arrangement the trustees will sell the land and erect a building for an industry which has to pay a certain percentage of the total, usually 25 per cent, in cash and the remainder in the form of annual rental, spread over a term of 10 or 15 years, with interest on the unpaid balances. The trustees naturally do not wish to locate an industry which is not financially capable of discharging the responsibilities incident to a location in the Central Manufacturing District. Like all good propositions, it has nothing cheap about it. The advantages claimed for the District are evident and they fully justify the investment required. They are also interested as much now as originally in securing industries of which the production will be sufficient to materially add to the tonnage of the

Typical Central Entrance of Quartermaster's Department

PRINCIPAL STREET FACADE



UNITED STATES COLD STORAGE BUILDING, CENTRAL MANUFACTURING DISTRICT, CHICAGO

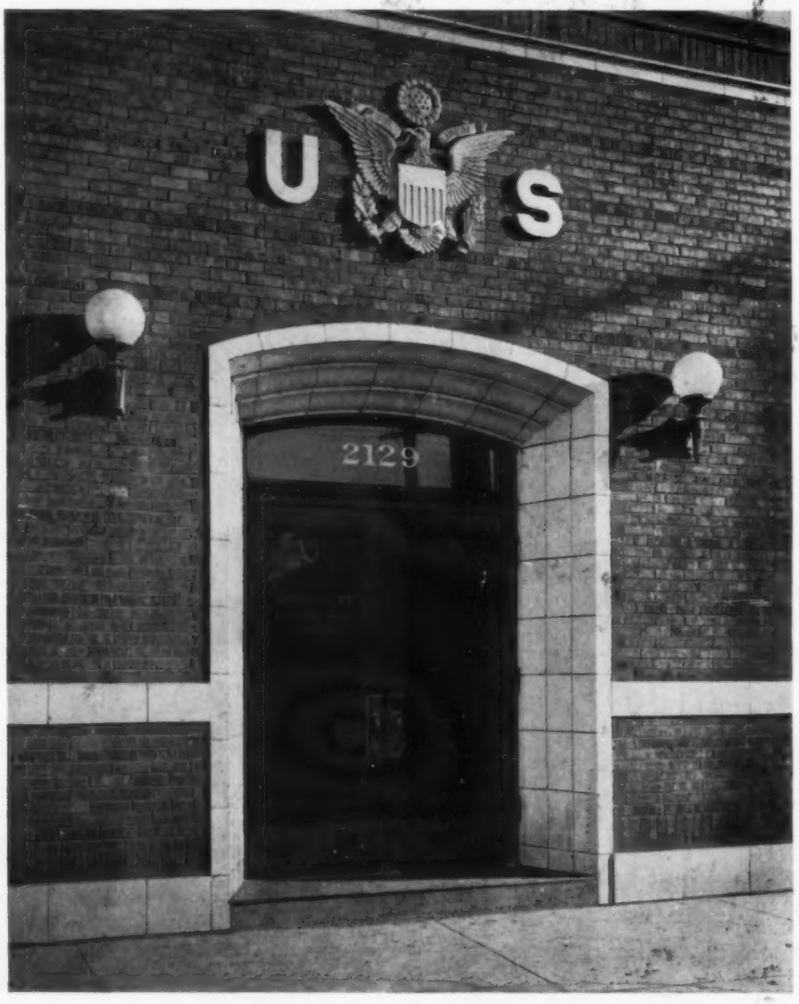
S. SCOTT JOY, ARCHITECT

Chicago Junction Railway, whether in carload or less than carload freight.

From the manufacturer's standpoint, the problem of financing centers chiefly around the improvement in his business prospects resulting from the advantages he secures through his location in the District. If his business has been established for a long period of years, and he has been able to lay up a surplus for the purpose of investing in a new site and building, he finds the "Contract of Purchase" plan the most economical and profitable. On the other hand, if his business is in process of building and he needs its income to help its growth, the lease plan is decidedly more favorable. Most manufacturers, of course, are endeavoring to build up permanent commercial structures. They see in settling in the District a chance to give their businesses naturally healthy growth which is bound to come with the best available modern manufacturing and shipping facilities, and with this growth they foresee a further opportunity to introduce permanence by discharging the responsibility incurred in buying their respective locations.

The District is adapted for the manufacture of practically any product. In Chicago there are more than 11,000 manufacturing plants. This fact is an indication of the unexcelled advantages to be had here. The argument which applies in the case of Chicago as a location, applies equally to the Central Manufacturing District, and in some respects the District has additional advantages. There are no restrictions to exclude certain lines of business from the District, but the trustees, with an eye to the interests of residents already located, are adverse to negotiating with concerns the business of which would endanger the interests of others already established.

The entire District organization is trained to exert itself toward the maintenance of mutually agreeable and helpful relations. The management has continually in mind the necessity for co-operation between the residents in this community and between the residents and the trustees. The policies of the trustees are liberal, and consistent effort is made to assist the industries in any possible way for promoting efficiency.



Entrance Doorway, U. S. Cold Storage Building

In the contracts with the United States government, through which resulted the new permanent Army Supply Depot, the trustees acted as general contractors. The government purchased altogether approximately 750,000 square feet of land, having a frontage of 1525 feet on 39th street with a 500-foot depth. This ground was utilized by the government for the erection of three great permanent warehouse units and the largest cold storage plant in America. The building of this plant was approved by the War Department upon the condition that should it be decided at the close of the war that it was not required, the trustees would re-purchase it from the government at a price to be fixed by appraisal. The early termination of the war caused the government to abandon this project, and in accordance with their agreement the trustees took over the cold storage warehouse, giving the government in return the third permanent warehouse unit and a cash sum to make up the total of the storage plant's appraised value.

ENGINEERING DEPARTMENT

Charles A. Whittemore, *Associate Editor*

Steel Construction

PART I. GENERAL CONSIDERATIONS

By CHARLES L. SHEDD, C.E.

THE use of steel beams and columns was developed when it became necessary to erect larger structures than could be built with wood construction, in which solid wood and masonry would take up too much room. Before the steel beam became a commercial possibility, wrought iron beams had been in use. Wrought iron was not as strong as steel, but the passing of time has demonstrated that it had qualities that do not exist in steel. It does not deteriorate nearly as fast from moisture and therefore, in some classes of work, has a much longer life.

These beams were at first merely used in floors to span between walls, and usually brick arches were formed from beam to beam. Then it was found that one beam could be framed to another by the use of connection angles fastened to their webs. This permitted framing around stairways or other openings in the floors. The next were used as compression members; that is, as small struts in the interiors of the buildings. The sizes of these struts were increased until large columns were made capable of carrying even the outside walls, as may be seen by reference to the illustrations. Some of these columns carry millions of pounds. By using columns in the outside walls it was possible to make the walls themselves quite thin, in fact no thicker than would be necessary for a one-story building, and on tall buildings much greater speed could be made in construction as the steel frames could be erected rapidly and with very little temporary bracing, so that it was possible to start a separate gang of masons on each floor to build the walls resting on the beams, just as if each story were a separate building. As a matter of fact, in practice the masons do not start with a separate gang on each floor but often start several gangs on floors six or seven stories apart, and each gang works up until it reaches that working next above.

Between these beams various kinds of material are used for the floors, including wood for non-fireproof buildings, and for fireproof buildings brick and terra cotta arches, reinforced concrete and various patented materials such as gypsum.

Under the columns bases are constructed to distribute the loads to the foundations. Small steel bases, built with the columns themselves, are used for the smaller loads, cast iron for larger loads and cast steel for still larger loads. The foundations are usually made of concrete and when these bases are not large enough to distribute the loads over sufficient areas of concrete, steel beams are placed in layers under the bases to increase the foundation areas. These grillage beams are used to a large extent to distribute the loads over sufficient areas so that the soil will not be over-stressed, but with the increased use of reinforced concrete such beams have largely disappeared from use. Some 20 years ago a stone block was used between the cast base and the concrete, but its use has been given up almost entirely.

In Fig. 1 are shown various steel shapes. A is known as the I beam; W is the web; F the flange, and f the fillet. The principal work done by a beam is to resist bending. The most of this is resisted by the flanges while the web resists shear, principally. Hence the web is made as thin as possible to resist this shear and still be strong enough to prevent buckling from the compressive strains. The flange is designed to be sufficiently wide to resist compression. B is known as the channel and is about the same as half of an I beam. This section can be used better than the I beam in some places, such as around stair and elevator openings, in spandrel sections, to carry hangers, and to make columns and compression chords of trusses. C is an angle section with the two "legs" of equal length. It can be used for lintels, spandrel sections, shelf angles, connections of beam to beam and for columns. D is another angle with unequal legs. E is the T section. It is used for small struts and occasionally for lintels.

F and G are Bethlehem sections. F is a girder beam and G the H column. F is the same as A excepting that it is a newer style and made only by one company. Its difference consists in having a broader flange. This makes it stronger in bending; that is the flange is larger in proportion to the web than is the case with the ordinary I beam. The manufacture of these beams was made possible by a new process. In the rolling of the ordi-

nary beam and channel a large piece of red hot steel is passed between two rolls which roll against the webs, the ends of these rolls pressing against the flanges. Outside the flanges are stationary guides against which the metal squeezed out from the rolls is pressed and then forced out between the ends of the rolls and the guides until the flange is formed. To get the best results it is only possible to force the flange out to a limited distance as this metal, not being rolled, would not be as dense as the web which had been compressed between the rolls. In the Bethlehem process the guides outside the flanges are replaced by rolls revolving at right angles to those rolling the webs, thus shaping and condensing this material.

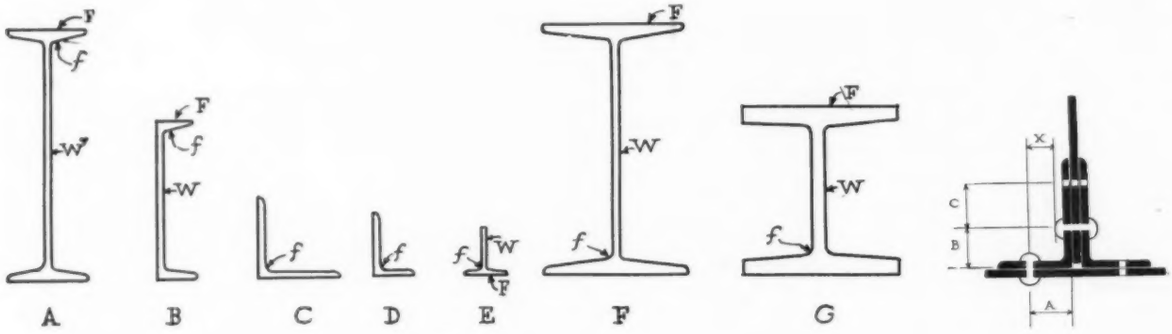


Fig. 1

Fig. 2

G is the Bethlehem H section which is made in the same way as their I beams, but is made with the depth about equal to the width of the flange. These sections are used as columns in competition with the ordinary plate and angle column. Besides these shapes there are the flat plates, the round rods and the square rods. The plates are used in plate girders, trusses, columns and for reinforcing and connecting beams. The rods are used as hangers and as reinforcing material in concrete.

In designating the different shapes certain conventional methods have been adopted. For I beams it is customary to mark one such as a "12″ I 31½#." The 12″ is the depth of the beam, that is from out to out of flanges, while the 31½# is the weight in pounds per lineal foot. It seems preferable to put the I between the two numbers to separate them rather than to place it at the end as some do. The fraction, rather than the decimal, is also preferable on plans where a decimal point is not altogether desirable. The channels are marked similarly as "15″ [33#." It is frequently written so that the sign for the channel shows which way it is intended that the channel should turn when in place in the building. Angles are designated as "6″ x 6″ x ¾″ L" or "5″ x 3½″ x ⅜″ L." The first two figures represent the length of the legs on the outside of the angle and the fraction at the end shows the thickness of the legs. When the legs are of unequal length the greater is placed first. It has been suggested that it would be an improvement on this practice if the lengths of the legs were placed in such order as to show which way they turned. The first might be the horizontal leg, or in the case of a vertical section it might be the outstanding leg. This appears to the author to be a good suggestion if it could be universally adopted. Ts are marked as "3″ x 3″ x 6.8# T," the first two figures being the width of flange and depth of stem respectively, and the last the weight in pounds per lineal foot. Here the decimal must be used as the weight varies from the halves and quarters. The thickness of the metal is not given, as in the case of angles, as the stem bevels considerably being thinner at the end than it is up against the flange. Bethlehem beams are marked "15″ BI 38#" or "24″ BG 120#" as in the case of the standard I beams. "BI" stands for Bethlehem I beam and "BG" for Bethlehem Girder beams. The catalog divides the beam sections into these two classes, the larger beams being known as girders. The H columns are designated as "14″ BH 170.5#." The 14″ is the approximate depth of the section. These vary considerably in actual measurement from the lightest section to the heaviest, due to the method of manufacture. The same rolls are used for several different weights, but are spread farther apart for the heavy weights. This is true of the standard shapes also, but as the guides for the flanges are stationary or fixed for the different weights the depths do not vary. Since the manufacture of these Bethlehem shapes began the Carnegie Co. has begun the manufacture of some new I beams to compete with them, and some small H sections smaller than those made by the Bethlehem Co. Plates are marked as "16″ x ¾″," the first being the width and the last figure the thickness. It is usual to use as the width, not the smallest dimension but that from which the plate would probably be cut. This of course would be as near even inches as possible.

These different pieces of steel are fastened together by bolts or rivets. Rivets are used in any work of importance, as they are stronger and less

liable to loosen. When the rivet is placed in the hole it is red hot, with one head already formed. When the other head is formed the rivet is so compressed that it expands until it completely fills the hole. If the rivet is not sufficiently heated or properly driven, a competent inspector on the work would reject it, cause it to be removed and driven over again. In building work rivets are usually ¾ inch in diameter. In the flanges of beams less than 8 inches deep and in angles where the leg is less than 2½ inches a smaller rivet must be used such as ⅝- or ½-inch. In very heavy construction rivets of ⅞-inch size or occasionally even larger are used.

In the mill, the beams, etc., are rolled in long lengths and afterwards sheared into the desired lengths. The edges of the metal are therefore classed in two divisions—rolled edges and sheared edges. As the rolled edge is much more accurate than the sheared edge, rivets can be driven nearer to it than they can to the sheared edge. With rivets it is common practice to use minimum distances from the center of the rivet to the rolled edge; the custom with ¾-inch is to use 1⅛ inches for rolled edges and 1¼ inches for sheared edges. More conservative engineers use 1¼ and 1½ inches respectively. In Fig. 2 is shown the lower flange of a plate girder. It shows the lower part of the web plate, the two flange angles, a flange plate and the rivets to fasten them together. This will illustrate the placing of rivets in angles. We will assume that the usual ¾-inch rivets are used. In order that the rivet may be properly driven the distance X must not be too small when the rivets come opposite each other. This distance should not be less than 1⅛ inches for ¾-inch rivets.

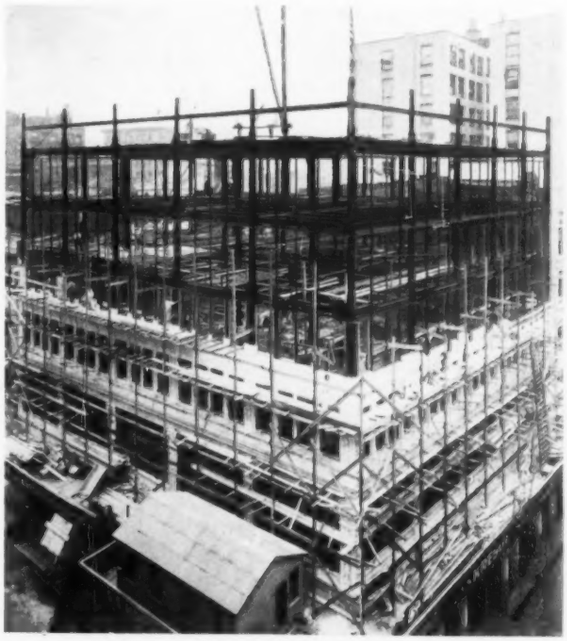
For convenience certain standard distances have been adopted for different sized angles for the distances A, B and C. These distances are called gauges. For legs 4 inches or less one gauge line, that is the distance A, is used. For a 2½-inch leg the gauge A is 1⅜ inches; for a 3-inch leg, 1¾ inches; for a 3½-inch leg 2 inches, and for a 4-inch leg 2½ inches. In a 5-inch leg two gauges are generally used but C is so small that the rivets should not be driven opposite each other. This is not on account of its not being possible to drive them but because there would be so little metal left between the holes that the strength of the angle would be too greatly impaired. B is 2 inches and C 1¾ inches. Sometimes only one gauge line is used, and when such is the case A equals 3 inches.

In a 6-inch leg B is 2½ inches and C is 2¼ inches. If the thickness of the angle is not too great these dimensions are sometimes reversed, and in some cases B is made as small as 2 inches when the stresses are such as to cause a bending on the angle which can be held more firmly by a small gauge. In an 8-inch leg B and C are both 3 inches. In some cases three gauge lines are used for angles not too thick; under these conditions all three distances are made 2¼ inches.

As was noted in the case of the 5-inch legs, the rivets cannot be too close together on account of weakening the angle or plate too much. It is usual to make this distance not less than 2¼ inches. When possible it is good design to keep the distance 2½ or 3 inches. This distance is called the "pitch." In compression members the pitch should not be too great as the outside metal might buckle between the rivets. It is common practice to limit this to 6 inches. Some engineers, including the writer, limit it to 5 inches when the outside metal is only 5/16 inch thick. It is also advisable not to have the rivets too far apart in a direction at right angles to the stress. This is usually limited to 12 inches. Likewise, the distance from the rivet to the edge of the plate should not be too great in compression members. Eight times the thickness of the plate, and never more than 6 inches, is a common requirement.

In Fig. 3 is shown the top flange of an I beam. The distance from the top of the flange to the point where the fillet joins the web is known as the "k distance." When one beam is supported at its end by another, the first is usually "framed into" the second beam. When this is done they are generally connected on their webs by "connection angles." If the beams are flush on top or bottom the flange of the first would strike the flange of the second. Therefore, the flange of the first, with a portion of the web, has to be cut off. This is known as "coping the beam."

If the top of the first beam is lower than the top of the second, by a distance less than k, a small



The S. S. Kresge Co. Building, Boston, is Typical Steel Frame Construction, Referred to in this Series of Articles

Newhall & Blevins, Architects
Charles L. Shedd, Engineer

cope must be made, but if the distance is greater than k no cope is necessary. The coping is an appreciable proportion of the cost of "fabrication" of the steel therefore, if it can be avoided without causing an equal additional cost in the building, a saving may be easily effected. In many cases another form of connection may be used, with no additional cost or inconvenience, if the designer will bear in mind the resultant economy.

The connection angles have been standardized and are universally employed where no special

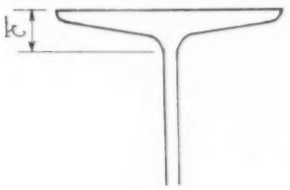


Fig. 3

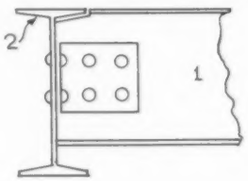


Fig. 4

conditions are required. There are, however, two standards, known as the old and the new. The new type is not as strong as the old as a new consideration has been taken into account in its design. This is in computing the bearing of the rivets on the web of the first beam. As this web is between the two connection angles, it is known as an "enclosed bearing," and has been computed to resist greater stresses than heretofore. Besides this, no account has been taken of the bending moment. There seems to be no doubt as to the propriety of considering the "enclosed bearing," in the writer's opinion, but the neglect of the moment appears to be worthy of serious consideration. That there is a moment no one would deny. As there is such a moment it must be resisted in some way. This may be done in either of two ways if it is not figured on the rivets. One way is by friction between the angles and the web of the first beam; the other way is by tension on the heads of the field rivets passing through the angles and the web of the second beam. It has never been considered good practice to consider either friction or tension on the heads of rivets and the writer would be very reluctant to do so. He therefore feels that unless a special investigation were made of the specific case, using the old recognized rules of computation for the stresses, it would be advisable to use the old standard beam connections.

In Fig. 4 is shown a 10-inch beam, framing into a 12-inch beam with the old style standard connection. They are shown framing flush on top with the top of the first beam coped. The two angles are each 6″ x 4″ x 7/16″, and 5 inches long. The four rivets connecting them to the first beam are driven in the shop. There are four rivets in the 4-inch legs of the angles, two in each angle. These are driven in the field, that is on the site of the building during erection. In all structural work it is important to have the field-driven rivets as few as possible. This is to effect economy and to save time; besides, a shop-driven rivet is driven under more ideal conditions and is less likely to be faulty. This distinction is not so important as it was before the time when power came into general use for driving field rivets. On small jobs, power is not now used as a rule, the driving of the rivets being done by hand. At the present time the mechanics doing this work do not appear to be as skillful or as careful as they were years ago. This often results in loose heads, in rivets not completely filling in the holes, and in the heads not being concentric with the stems.

It is sometimes desirable to hang a portion of one floor or a stair landing from the floor above. A hanger of a given strength takes up less room than a strut of equal strength, as the strut must have some considerable breadth in all directions to avoid buckling. A convenient method of forming a hanger is to use a narrow plate and rivet it to the back of a channel above and below. If a channel is not strong enough, two channels may be used and the plate or a round rod installed to pass between them. Sometimes the rod may be flattened out and this flat portion riveted to the channel. It is best not to attempt to flatten both ends of a rod with rivets as it is more difficult to make the adjustment accurately. Sometimes two angles are riveted to the back of a channel and the rod passed up between them. The angles can be made so that at the top of the rod they are flush on top with the channel and the nut on the rod will rest partly on the angle and partly on the channel. A bolt may be put through the two angles to hold the rod snugly against the back of the channel.

Another kind of hanger is formed by bending the plate at the top and, with a second short piece riveted to it, to form jaws engaging the flange of an I beam. This is not a good method to use where the load is of any considerable amount, as its strength is limited to the resistance of the plates to straightening out. It is used principally for hung ceilings. Sometimes these plates are extended upwards until they can be riveted to the web of the I beam, but that is not ideal as the plates are liable to straighten out somewhat, throwing the hung portion out of adjustment. Another form of hanger is made by slotting the flange of the beam and passing the hanger through this slot and riveting it to the web of the beam. This is an expensive method and in any event can only be done toward the end of the beam where there is more material in the flange than is necessary to carry the stresses in tension. Rivets in the bottom flanges of beams also weaken the beams, sometimes materially.

Calculation of Stresses in Wood Trusses

By MILO S. FARWELL

IN a previous article in THE FORUM the graphic method of solving the problem of stresses in trusses was discussed, and the purpose here is to give design data for the use of the algebraic method. The Howe type of truss is used, as it is often employed for supporting roofs over structures of various types where the roofs are flat and almost symmetrical.

Mr. Farwell's article carries with it a story of interest to architects and engineers generally in indicating a method of truss figuring based solely on algebra. It is a method of long standing but is not used as frequently as the graphic method, particularly in the East. One reason for this is probably that the graphic method shows instantly any error by its failure to close. In the analytic method, however, despite the lack of graphic proof, it is easy to check all calculations so that the possibilities of error are negligible. The computations here given illustrate the method as employed by Mr. Farwell in his practice in Oregon. The formulae for the design data used have been taken from the work on "Roof and Bridge Trusses" by Merriman & Jacoby.—Editor's Note.

THE purpose here is to give design data for the calculation of the stresses in the various members of a wooden truss of the Howe type. This truss is in common use for the support of roofs over garages, dance halls and similar buildings, often supporting a ceiling load on the bottom chord.

For our present purpose we will choose such a truss as might be used to support a flat roof over a garage. The span of the truss is to be 80 feet, with eight panels of 10 feet. The height of the truss to be 8 feet. Fig. A is a diagram showing the center lines of the members and the panel loads to be applied at the panel points of the top chord. We will assume that the roof joists rest on purlins which frame on the top chord at each panel point. The bearing for the truss at L_0 is to be a masonry or concrete pier.

The solution of this problem will be made without the use of any kind of a graphical diagram and will be according to what is known as the chord increment method. This is done by finding the number of shear points on each side of the center line. If the truss has an even number of panels, one-half of the shear for the center panel must be used, thus: $\frac{1}{2}$ L_4 plus L_3 plus L_2 plus L_1 = total shear on one side of the center. L_1 is 3.5, L_2 is 2.5, L_3 is 1.5 and L_4 is 0.5.

The next step is to find the tangent and secant of the angle between the bottom chord and the end post at the joint L_0. After this, by the method of chord increment, find the horizontal component of the stress in the web member adjacent to the chord in question. As an example, the shear of the web member $L_0 - U_1$ is 3.5. Multiply this by the value of tangent θ, and the result will be the increment of the chord stress. This multiplied by the panel load will give the actual stress at the joint L_1. The stress coefficient at the succeeding points is found by adding the stress of the previous member to the increment of the member in question.

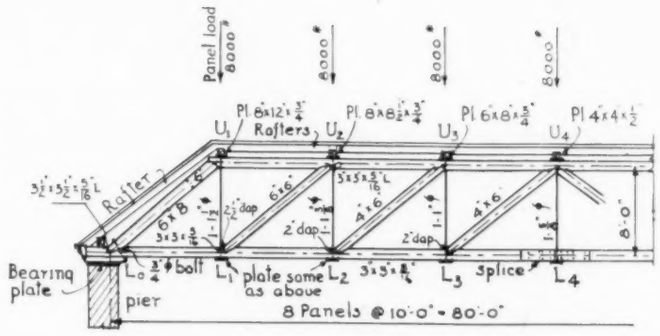


FIGURE A

CHORD STRESSES

Member	Shear	increment	Stress	Actual Stress	Chord
L_0-U_1	3.5	2.8	2.8	22,400	U_1U_2
L_1-U_2	2.5	2.0	4.8	38,400	U_2U_3 L_1L_2
L_2-U_3	1.5	1.2	6.0	48,000	U_3U_4 L_3
	.5	.4	6.4	51,200	L_3L_4

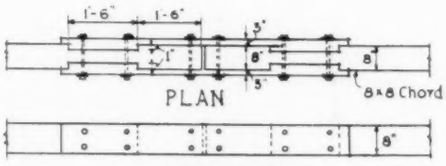
WEB STRESSES

Member	Shear	Stress	Actual Stress
L_0-U_1	3.5	4.2	33600
L_1-U_2	2.5	3.0	24000
L_2-U_3	1.5	1.8	14400
L_3-U_4	.5	0.6	4800
U_1-L_1	3.5	3.5	28000
U_2-L_2	2.5	2.5	20000
U_3-L_3	1.5	1.5	12000
U_4-L_4	.5	.5	4000

Secant of Angle θ $\frac{12.8}{10} = 1.28$

Tangent of angle $\theta = \frac{8}{10} = .8$

FIGURE B



DETAILS of SPLICE

FIGURE C

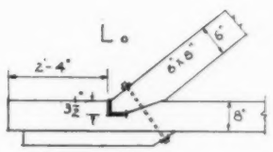


FIGURE E

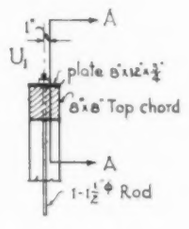


FIGURE D

The stress in the chords U_1-U_2 and L_0-L_1 = shear 3.5 times tangent Θ (0.8) = 2.8 the chord increment. 2.8 times the panel load (8000 lbs.) = 22400, the actual stress. The stress in the next chord is found thus: multiply 2.5 by tangent Θ (0.8) = 2.0 increment of chord U_2-U_3 and L_1-L_2. The stress in these chords is increment 2.0 plus the stress in chord U_1-U_2 and L_0-L_1 (2.8) = 4.8 stress in chords U_2-U_3 and L_1-L_2.

The stresses in the web members are found by multiplying the shears by the secant Θ, thus for L_0-U_1, stress is shear 3.5 times secant Θ (1.2) = 4.2, multiply this by the panel load, 8000 for the actual stress, which is 33600 lbs.

The accompanying table (Fig. B) shows the increments and stresses for all members.

Timber to be used #1 common rough Douglas fir
Allowable stresses,
1200 lbs. per sq. in. for tension
1200 lbs. per sq. in. for compression with the grain
300 lbs. per sq. in. for compression across the grain
200 lbs. per sq. in. for shear parallel to the grain
16000 lbs. per sq. in. for tension in steel
Compression formula for all members in compression:

$$\frac{1200\ (1-\text{Length of chord in inches})}{60 \text{ times depth of chord}}$$

DESIGN OF MEMBERS. The joint L_0 is designed without the use of a steel shoe. This is the most economical detail for a wooden truss, but can only be used where there is sufficient end distance. In many cases it is necessary to use a steel shoe on account of the end of the truss coming inside of a wall.

The bottom chord is shown with a splice. Securing a timber 84 feet long is usually difficult, so a splice should be used as shown.

The size of the bottom chord has been increased over the size required for the stresses so the splice will develop full strength.

Refer to figure C for details of the splice.

Lower chord $L_3 - L_4$ stress = 51200 lbs.

$\frac{51200}{1200}$ = 42 sq. ins. required
6″ x 8″ timber is O. K.
Upper chord $U_3 - U_4$ stress = 48000 lbs.
by compression formula,

$1200\ (1 - \frac{12 \times 10}{60 \times 8}) = 900$ lbs. per sq. in.
1 − 8″ x 8″ = 64 sq. ins. section
64 times 900 = 57600
8″ x 8″ is O. K.
End Post $L_0 - U_1$ stress = 33600
by compression formula,

$1200\ (1 - \frac{12.8 \times 12}{60 \times 8}) = 816$
1 − 6″ x 8″ = 48 sq. ins. section
48 times 816 = 39168
6″ x 8″ is O. K.

Rods
U_1 and L_1 − stress 28000

$\frac{28000}{16000}$ = 1.75 sq. ins.

Use − 1–1½″ round rod
area − 1½″ round = 1.76 sq. ins.
$U_2 - L_2$ − stress

$\frac{20000}{16000}$ = 1.25 sq. ins.

Use − 1 − 1⅜″ round rod area = 1.49 sq. ins.
$U_3 - L_3$

$\frac{12000}{16000}$ = .75 sq. in.

Use − 1 − 1″ round rod area = .78 sq. in.
$U_4 - L_4$

$\frac{4000}{16000}$ = .25 sq. in.

Use 1 − ⅝″ round rod area = .30 sq. in.
Plates required for joints
U_1 and L_1 − stress 28000 lbs.
Refer to Fig. D
Bending Moment to be taken at AA 1″ from center
Compression wood at 300 lbs. per sq. in.
B. M. at AA = 300 × 3 × 1½ = 1350 lbs.

$\frac{.75 \times .75 \times 16000}{6}$ = 1500 lbs.

therefore use plate ¾″ thick
Area of plate = 8 × 12 = 96 sq. ins.
96 × 300 = 28800
Area O. K.
Use plate 8″ × 12″ × ¾″
Joint $U_2 - L_2$ − stress = 20000 lbs.

$\frac{20000}{300 \times 8}$ = 8.3 Make plate − 8½″

Area of plate − 8 × 8½″ = 68 sq. ins.
68 × 300 = 20400
Area O. K.
Use plate 8″ × 8½″ × ¾″
Joint $U_3 - L_3$ − stress − 12000

$\frac{12000}{300 \times 8}$ = 5 Make plate − 6″ long

Area of plate − 6 × 8 = 48 sq. ins.
48 × 300 = 14400
Area O. K.
Use plate − 6 × 8 × ¾″
Joint $U_4 - L_4$ − stress − 4000

$\frac{4000}{300 \times 4}$ = 3.3 Make plate − 4″ long

Area of plate 4 × 4 = 16 sq. ins.
16 × 300 = 4800
Area O. K.
Use plate 4″ × 4″ × ½″
Joint L_0 − stress from $L_0 - U_1$ = 33600
See Fig. E for Horizontal shear

$\frac{33600}{6 \times 200}$ = 28″ for end of chord

Depth of dap

$\frac{33600}{8 \times 1200}$ = 3.5 Make depth of dap − 3½″

Detail of splice for bottom chord, see Fig. C
Splice to be made between L_3 and L_4
at section AA
Net area of chord at AA
6 × 8 = 48 sq. ins.
Section is good for
48 × 1200 = 57600 lbs.
the 2 shear blocks at end of chord are good for
2 × 8 × 18 × 200 = 57600 lbs.
which is O. K.

MINOR ARCHITECTURE
EXEMPLIFIED IN MODERATE COST BUILDINGS

Innovations in Small Store Design

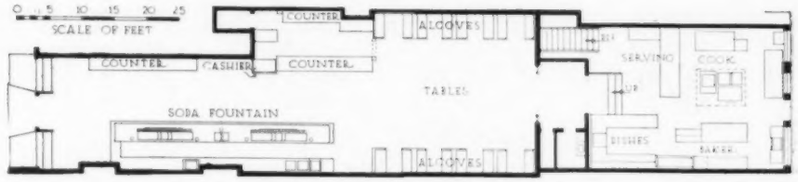
ILLUSTRATED BY THREE CANDY SHOPS IN BOSTON, MASS.

THERE are but few more interesting opportunities of giving a distinctive and highly decorative appearance to business quarters than are afforded in the designing and planning of soda and candy shops, tea rooms or luncheon rooms of the better class. The very purpose for which such quarters are to be used might be supposed to excuse the use of a certain degree of decorative treatment, which many conservative architects might consider unsuitable for business premises of most kinds, and this makes possible a gaiety of expression which would seem to be highly desirable in rooms of this sort.

The illustrations included here suggest the pleasing results which may be attained in work of this character. The designs of the most successful examples are comparatively simple, the aim being apparently to avoid ornament or decoration of any kind which is introduced purely for its own sake, and to rely, for decorative effect, upon well designed utilities and fittings and upon the use of materials in which excellence of texture, design or color is combined with necessary utilitarian qualities, and the results which good taste may secure in such work are surprising.

The Brunswick Shoppe, of which two illustra-

Detail of Fittings in Forward Part of Store at 306 Boylston Street
William Chester Chase, Architect

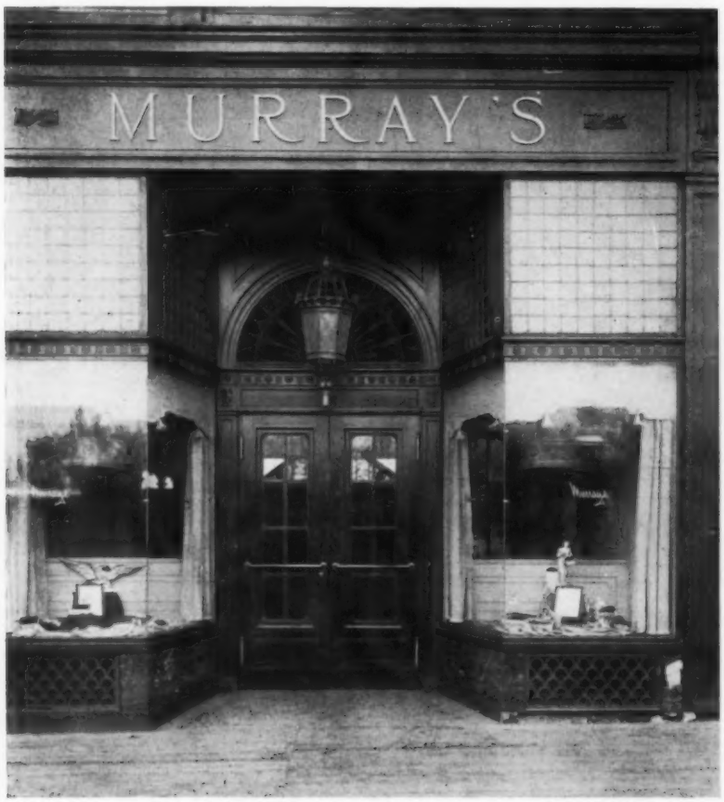


Floor Plan of Store at 306 Boylston Street
William Chester Chase, Architect

tions are given here, is a combination of soda and candy shop and luncheon or tea room. The space which has been devoted to the candy shop proper was until recently used as a florist's shop while the larger area, now arranged as a luncheon and tea room, was utilized partly as a store room and partly as a delivery room in connection with the hotel which occupies the premises. Between these two areas is placed one of the entrances to the hotel, but the adapting of part of the ground floor to a wholly different purpose has involved but little change in the planning of this street entrance and its stairway to the main floor above.

The walls of the candy shop are covered from the top of a dado to the ceiling with a scenery paper of brilliant coloring on a pale gray background and the necessary counters, show cases and other requisite fittings are of wood, painted white. The floors are laid with cork tiles in squares of black and gray. The tea room or luncheon room which, as may be seen by the floor plan, occupies considerable area, has been treated in a somewhat similar manner. Instead of using a scenery paper the walls from the dado to the rather low ceiling are covered with canvas upon which has been painted, in gorgeous coloring, the continuous landscape or garden scene which is a striking form of wall decoration. The windows upon two sides of the tea room are arranged with narrow valances and long straight draperies of gray blue, plain surfaced fabric with cream colored appliques, and the floor is covered with the same squares of black and gray cork tiling used in the candy shop. Necessary tables and chairs are of wood painted black, with simple decoration of bronze and the lighting fitments are of bronzed metal with figured cut glass prisms which lend to the tea and luncheon room a pleasing note of festive simplicity.

Another successful result, equally attractive but wholly different and secured by the use of other materials, is the candy and soda shop at the intersection of Beacon and Center streets in Brookline, a suburb of Boston. Here the requirements call for much less in the way of actual area and details of equipment than was true of the Brunswick Shoppe which has just been described, for in the shop which is under discussion the serving of luncheon and tea is either not done at all or else is of much less importance than the sale of candy and the serving of the usual soda and ices. The floors are of tile of plain colors in which are set inserts of blue, green and black. Walls are of scoured plaster having a slightly roughened surface.



Doorway and Show Windows of Store at 306 Boylston Street

Throughout this candy shop the woodwork of various kinds—wainscoting, counters, tables and chairs, together with built-in show cases, benches and other details—is of wood painted, with certain panels and other details polychromed in borders, swags or other motifs which seem to be in harmony with the generally Italian spirit of the setting. Against the painted plaster walls have been hung two modern Flemish tapestries in the soft greens and wood colors in which such tapestries are usually woven, and above the soda fountain and counter, serving to emphasize the decorative importance of what is the chief feature, is a

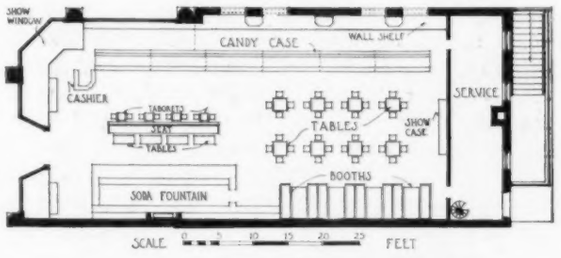
pleasing disposition of cut mirrors between columns which support a circular pediment in renaissance fashion. Added interest is conferred by the use of wrought iron lighting fitments, either suspended from the ceiling or fixed to the walls and having shades of decorated parchment to temper the brilliance of the electric lights. An examination of the floor plans of this shop will show that advantage has been taken of its corner location to arrange show windows upon the entire frontage on Beacon street and upon a part of that on Center street, while in the remainder of the wall space upon the side street are windows which light that portion of the shop where patrons are served at small tables. The width of the shop near the main entrance makes possible a built-in seat and several small tables down the center which add to the decorative interest of the shop and serve, at the same time, the convenience of patrons.

The attractiveness of another candy and soda shop, at 306 Boylston street, Boston, is due chiefly to the excellent taste with which the designing of the street front and the interior details have been treated, and the good judgment with which furnish ngs have been designed and color combinations selected. The front of the shop, as may be seen from one of the illustrations, has been given a very simple treatment in which marble, cast iron and glass are the principal materials, with wood used for doors. Within there exists sufficient well lighted area to make possible a somewhat unusual treatment, where in addition to the usual soda fountain and candy counters considerable space has been arranged with tiny tables, seating two or four, and a number of small alcoves or booths which consist of built-in seats or settles at the sides of small stationary tables which suggest the small "breakfast alcoves" which have become popular in city apartments and in small suburban or country houses.

In this shop the wall surfaces have been painted and then lined off with stone joints, the ceiling being left plain. The floors are paved with heather brown tile. Furniture, and the lower parts of such stationary fittings as cases, and the front of the soda fountain counter are of hard wood treated with mouldings and painted designs in the style of the Italian renaissance. Just back of the soda

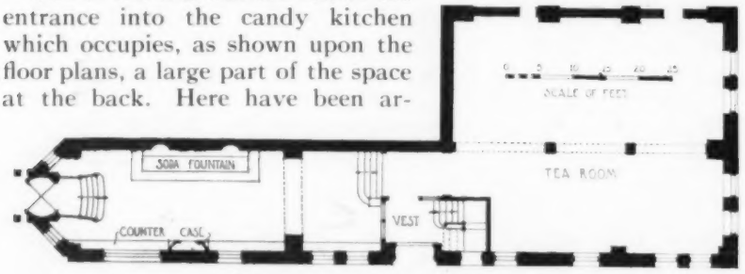
Space for Patrons and Service Door to Candy Kitchen in Store at 306 Boylston Street

fountain the wall treatment here takes the form of mirrors arranged in small panels surrounded by a painted frieze, pilasters and columns, and the central feature is an arrangement of cut mirrors surrounded by a broad border of painted decoration over which is placed a semi-circular painted panel. Parchment shades which are used to soften or tone the light from various hanging lighting fixtures suggest the design and repeat the colors used in the painted renaissance panels upon the counter and other stationary fittings. One minor detail, which adds much to the interest of this candy shop when seen from the sidewalk, is the use of black tiles, having soft, dull surfaces and laid in dark gray mortar, for the floors of the show windows. This background affords an excellent setting for the various objects likely to be placed in the windows of such a shop, a detail of considerable importance.



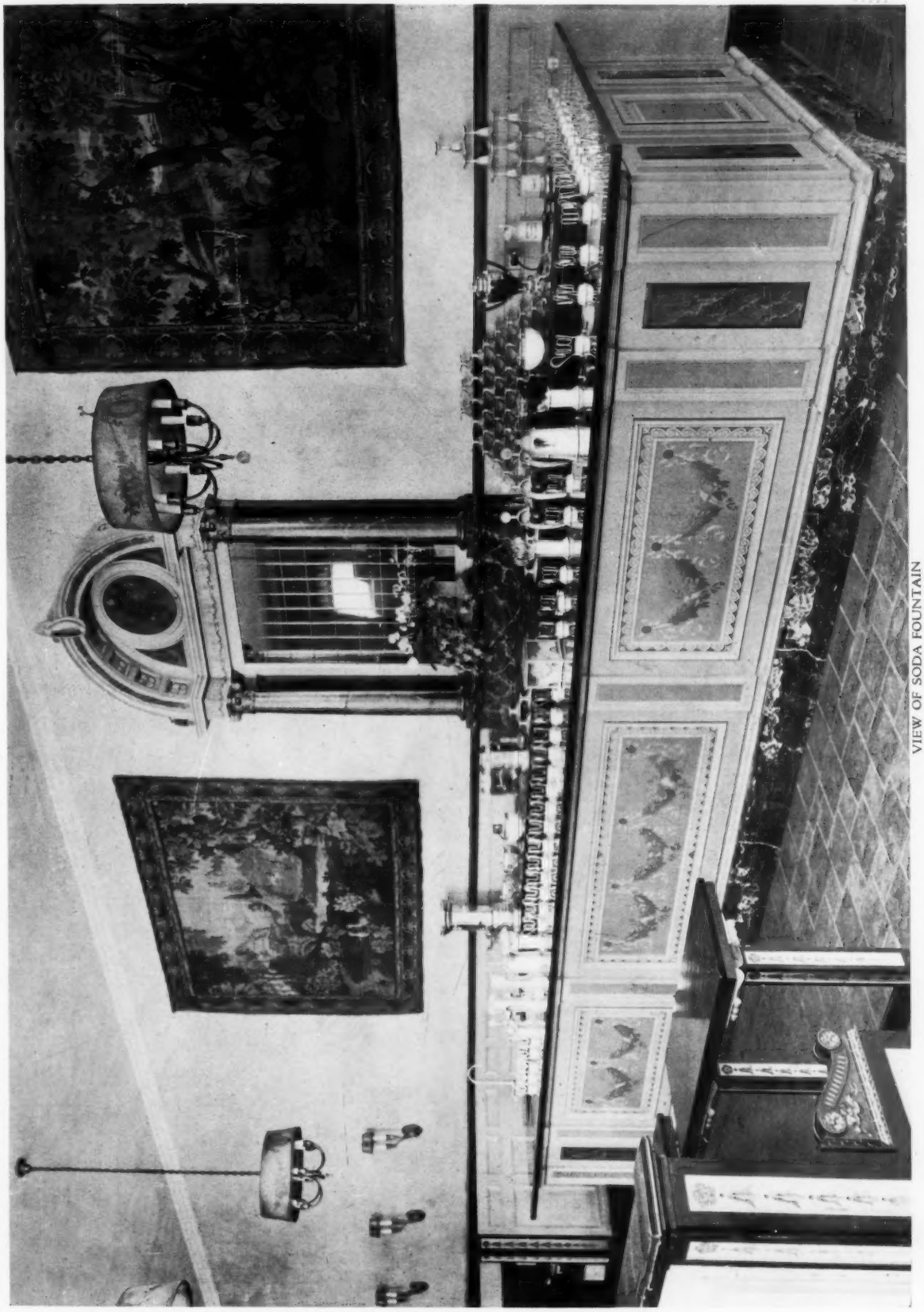
Floor Plan of Candy Shop at Brookline
James Charles Flaherty, Architect

One of the illustrations shows the entrance into the candy kitchen which occupies, as shown upon the floor plans, a large part of the space at the back. Here have been arranged the various utilities, steam kettles, bake oven, gas range, mixing and moulding tables, and numerous other details required, while a portion of the area is arranged as pantry or serving rooms for the washing of dishes, polishing of glass and other uses connected with the work of a shop of this kind. In the case of the Brunswick Shoppe the service quarters are in connection with those of the hotel of which this shop is a part, and with that at Beacon and Center streets, which is really not a luncheon room, and where the wares sold are probably made elsewhere, very little in the way of actual service facilities is required.



Floor Plan of Brunswick Shoppe

Soda Fountain and Tea Room Beyond in the Brunswick Shoppe
Blackall, Clapp & Whittemore, Architects



SODA AND CANDY SHOP, BROOKLINE, MASS.
VIEW OF SODA FOUNTAIN
JAMES CHARLES FLAHERTY, ARCHITECT

SODA FOUNTAIN AND ENTRANCE DOOR

TEA ROOM IN CONNECTION WITH STORE

THE BRUNSWICK SHOPPE, HOTEL BRUNSWICK, BOSTON, MASS.

BLACKALL, CLAPP & WHITTEMORE, ARCHITECTS

VIEW FROM STREET

FIRST FLOOR PLAN

SECOND FLOOR PLAN

DETAIL OF ENTRANCE FRONT

HOUSE OF FRED B. SMITH, ESQ., BALDWIN, LONG ISLAND, N. Y.

FRED B. SMITH, ARCHITECT

KITCHEN WING AND ENTRANCE DOORWAY

HOUSE OF FRED B. SMITH, ESQ., BALDWIN, LONG ISLAND, N. Y.

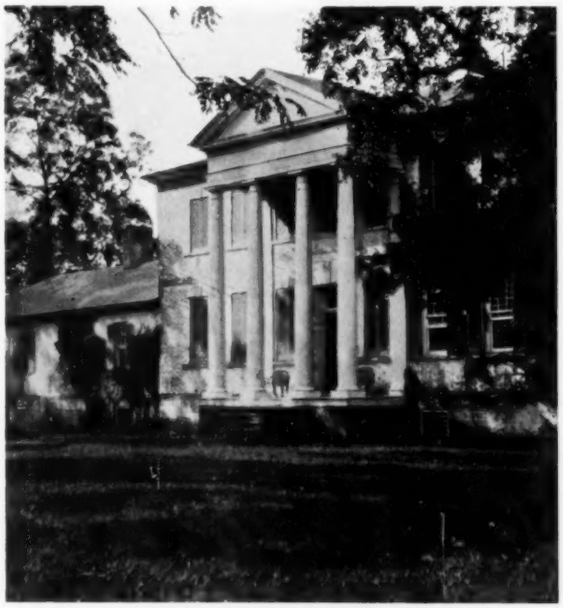
FRED B. SMITH, ARCHITECT

Details of Early Southern Architecture

TWO FAMOUS MANSIONS OF VIRGINIA

MEASURED DRAWINGS BY GODDARD M. WHITE

MODERN architects, and particularly many whose work is chiefly or largely of a domestic nature, sometimes turn for inspiration to American work of the eighteenth century. The architecture of many of these old houses, softened as it is by time, is quite as pleasing today as when they were built, and its suitability is much the same for these old houses were built for homes and the requirements of the American home, after all, have not varied greatly during two centuries.



The North Portico of "Sabine Hall"

Certain details—exterior and interior—are given here of Westover and Sabine Hall, two old houses which have played prominent parts in the social history of Virginia. In the case of Westover one of the chief points of interest is found in the accurate proportions of the facade, the lintel curve of the principal windows and the treatment of the main entrance. The doorway just dominates the elevation; if it were larger it would be too heavy, and if smaller this dominance would be lacking.

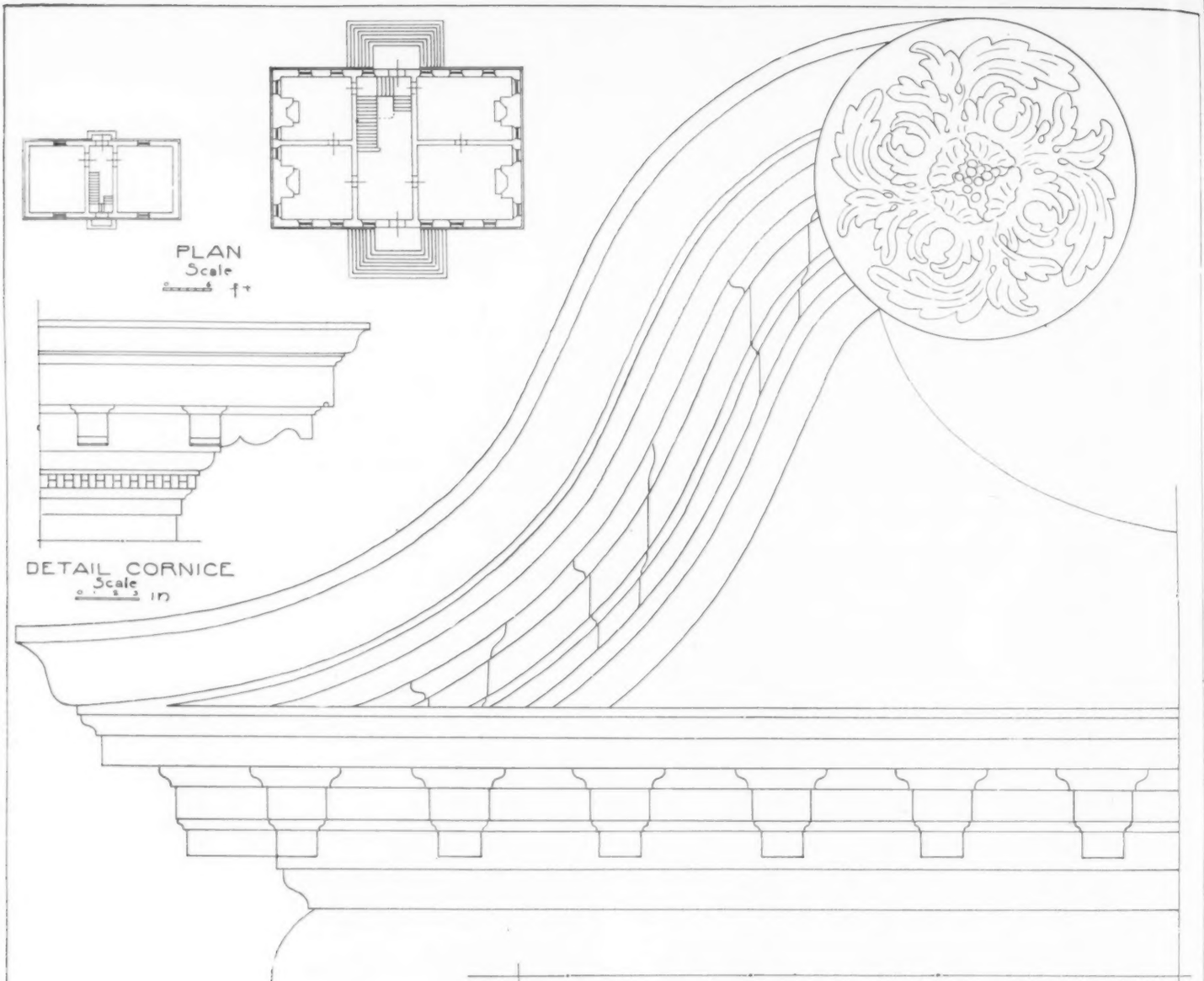
It should be an accepted theory that in the design of a colonial facade the main doorway, which is generally its chief architectural feature, should be just large enough to command, as it were, the elevation. Here the design is excellent; the start of the pediment is almost horizontal, then on either side the curve rises first slowly, then abruptly, ending in a spirited rosette of suitable size. The curves at no point become dead and the breadth of the pediment and the generous width of the space between the two give to the doorway an appearance of stability and dignity. The pediment of this main entrance at Westover is supported upon two fluted pilasters and before the entire doorway is a broad stone platform which is approached by steps returned against the house at either end.

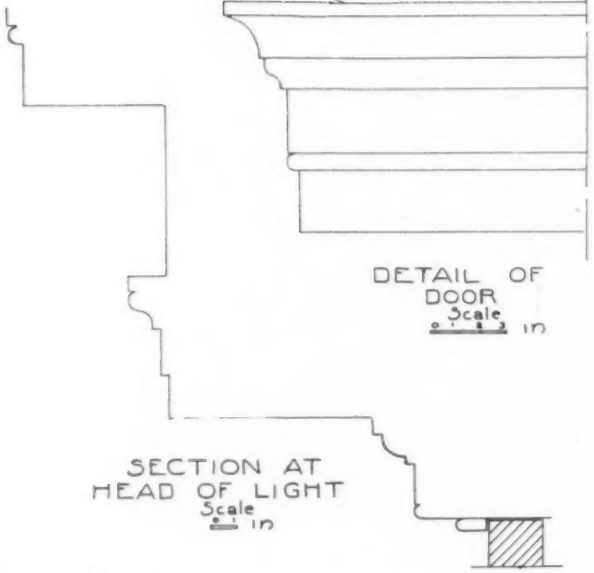
At Sabine Hall certain interior details are of particular interest, notably the doors, each flanked by two windows, which are placed at either end of the hall. These windows on either side of the doors, on the inside of the house, are framed by a quarter round instead of the usual architrave. This makes possible the building of the side partitions close to the windows and does not necessitate the hall being made the width of the architrave wider. The stairway at Sabine Hall leads to an upper hallway of even greater interest than that upon the main floor in that the ceiling is slightly lower and six windows are in place, three at each end. The stairway itself is placed in a stair hall to one side, but its fine workmanship is in entire accord with the other interior detail, especially the well designed balusters.

"Westover" from the Garden Walk

PLAN
Scale
0 4 8 ft

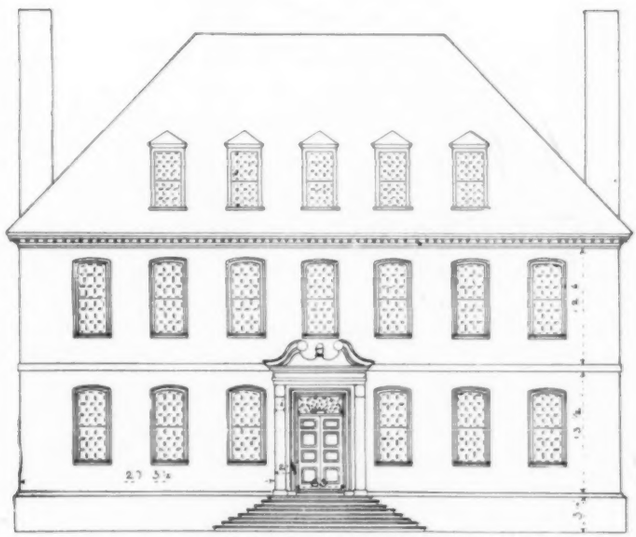
DETAIL CORNICE
Scale
0 1 2 3 in





DETAIL OF
DOOR
Scale
0 1 2 3 in

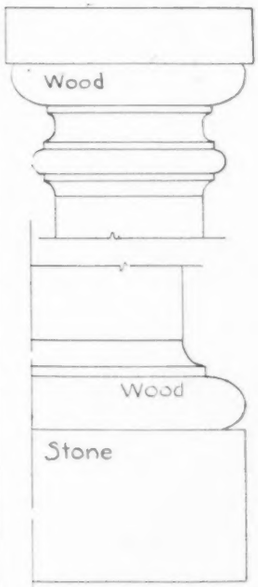
SECTION AT
HEAD OF LIGHT
Scale
0 1 in



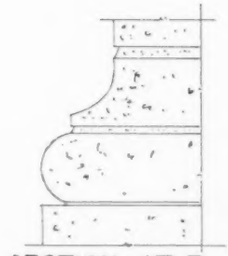
MAIN ELEVATION
Scale
0 4 8 ft

WESTOVER
JAMES RIVER
VIRGINIA

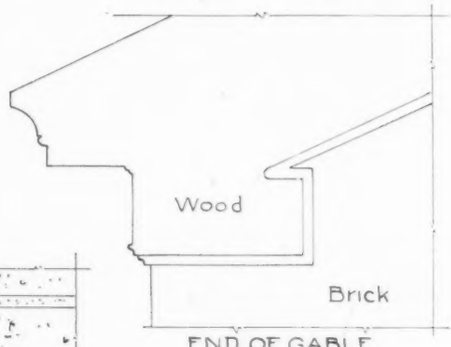
NORTH ELEVATION
Scale
0 1 2 3 4 ft



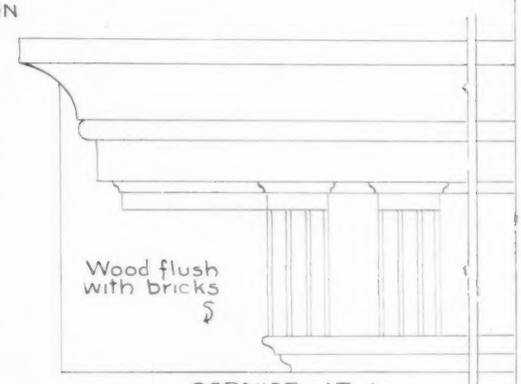
DETAIL OF COLUMN IN COLONNADE
Scale
0 1 2 3 in



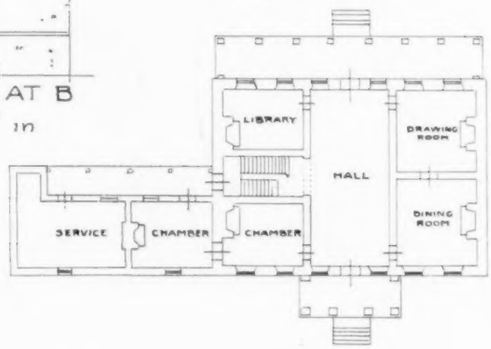
SECTION AT B
Scale
0 1 2 3 in



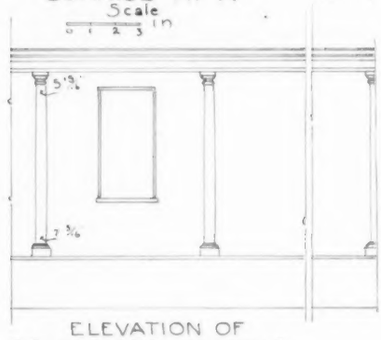
END OF GABLE IN WING
Scale
0 1 2 3 4 in



CORNICE AT A
Scale
0 1 2 3 in



GROUND FLOOR PLAN
Scale
0 4 ft

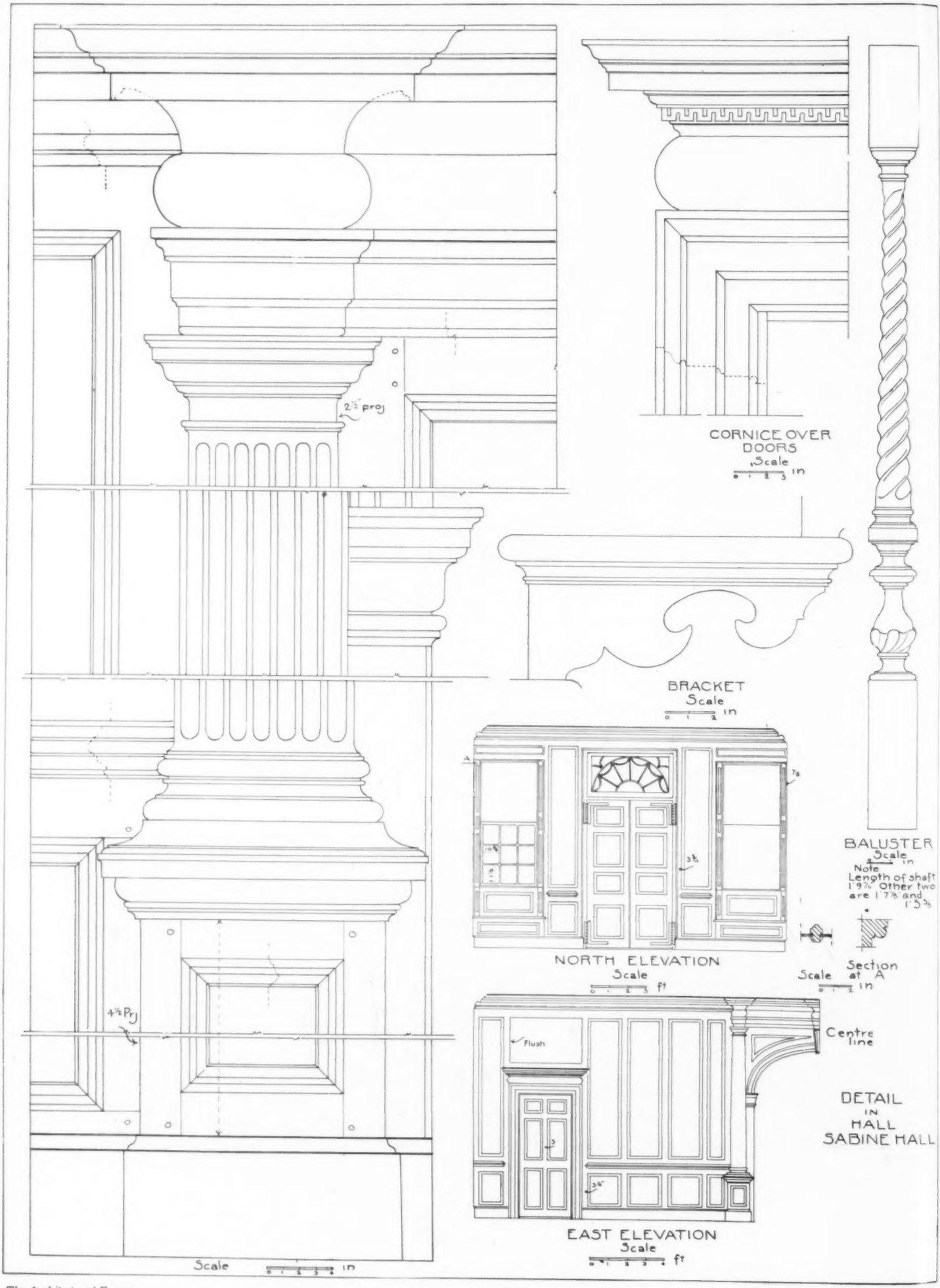


ELEVATION OF COLONNADE IN WING
Scale
0 1 2 3 4 ft

Note

Masonry is lime stone and brick Flemish bond
Bricks appear to very ⅛ in size
Headers 4" x 2¾"
Stretchers 8½ x 2¾
Joints ½"
Headers are eye bricks

1730
SABINE HALL
RAPPAHANNOCK RIVER
RICHMOND CO
VIRGINIA


2½" proj
4⅝" Proj
Scale in
CORNICE OVER DOORS
Scale in
BRACKET
Scale in
BALUSTER
Scale in
Note
Length of shaft 1'9⅝" Other two are 1'7⅞" and 1'5⅝"
NORTH ELEVATION
Scale ft
Section at A
Scale in
Flush
Centre line
DETAIL IN HALL SABINE HALL
EAST ELEVATION
Scale ft

DECORATION & FURNITURE

Jeanne Taylor, *Associate Editors*, Leland W. Lyon, R.A.

Decorative Fabrics Following Original Designs

THE field of possibilities of interior decoration is constantly being widened and enriched through the untiring efforts of manufacturers who have developed highly specialized departments of design. Here artists are creating new designs in furniture and fabrics, often adapting ideas and motifs from museum pieces and good originals in private collections.

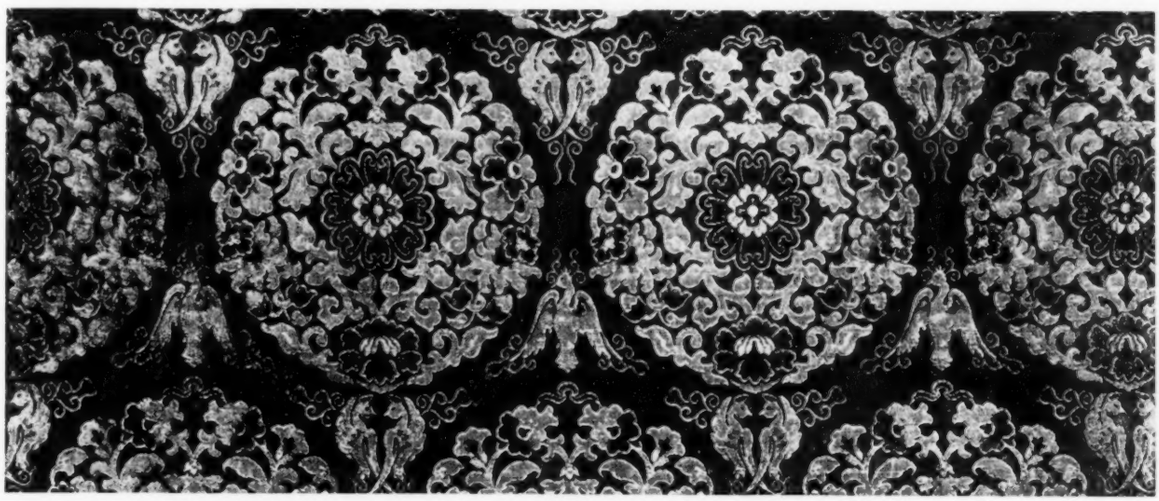
Probably as never before, there exists a demand on the part of the American public for better artistic expression in the elements and materials which make up a home, even of the moderate cost type. The widespread nature of this demand has been noticeable in its influence on domestic architecture of medium cost, where before much that constituted good design and good taste was confined to the more expensive homes. Thus it is that the proportion of well designed dwellings of average cost has greatly increased in the past few years.

Japanese Brocade Available in Several Color Combinations

This condition has created at once a demand and a steadily developing market for well designed furniture and fabrics. It is for this reason that the making of fine furniture and accurately designed decorative materials has passed from the workshops and hand looms of the craftsmen to the great factories and intricate, power-driven looms which without sacrifice of artistic merit place within the reach of many, products for artistic home making which before constituted the possessions of only the few.

It is evident, therefore, that the efforts of a large number of designers working in the industries producing decorative materials must result in placing on the market designs in decorative materials and good furniture, some of which are adaptations and others direct copies from originals developed in the

Photographs reproduced in this article by courtesy of Cheney Bros.



Chinese Brocade with "Cycle of the Lotus," Flying Fish and Phoenix Motifs of Chien Lung Period
Medallion reproduced from rare embroidery in the Metropolitan Museum of Art

Printed Silk Fabric Depicting *Mi-careme* Festival Scenes in Paris

various artistic periods of older countries. Nowhere, perhaps, is this condition more evident than in the class of materials used for draperies and drapery linings, wall hangings and panels, furniture coverings and other upholstery uses.

It is a recognized fact that hangings, wall coverings and carefully selected upholstering serve in large measure toward the furnishing of a room, particularly in these days when simplicity is the rule rather than the exception, and rooms are not filled with large quantities of furniture. Just because the modern home is no longer crowded with a variety of objects, it becomes more than ever important that what furnishings there are shall be exactly what are required for the correct expression of the character of the interior.

It is evident, therefore, that architects who include in their work the planning of interiors are interested in following the development in the production of decorative fabrics, and from time to time in this Department suggestions will be given of available designs which seem particularly fitted for decorative schemes, and not only for large dwellings, but for moderate cost homes.

We present illustrations of a number of decorative fabrics in silk, and as it is impossible to show

East Indian Settings Furnish Design for Silk of Oriental Character

Motifs from Spain and the Mediterranean in a Drop Pattern Arrangement for Silk

them in color, brief descriptions of several are given which may suggest uses for them.

Two brocade designs, one Chinese and one Japanese, are shown on the first of these pages. Both carry conventionalized figures and are based on various oriental motifs such as the Cycle of the Lotus, the Flying Fish and the Imperial Phoenix, as shown in the Chinese design.

On other pages four types of fabric design are presented, the first representing Paris in the mid-lenten or *mi-careme* festival season. The Cathedral of Notre Dame is to be noted in the background. The figures in the floats are the king and queen of the carnival. Under the trees, which represent the gardens of Luxembourg, are two costumed figures of the period of Louis XV.

Another design is Spanish in character, showing various typical diversions of the Spaniards. Thus the dominant scene is the bull ring, showing the *matadore* with red cloak in hand and sword upraised. To the right of this appears the garden of Granada with a troubadour playing a Spanish guitar to his lady on the steps above. Farther to the right is a gipsy girl dancing and playing a tambourine. To the left of the bull ring one catches a glimpse of the Mediterranean with Gibraltar

Textile Print Inspired by Work of Japanese Artists Showing Familiar Features

in the distance, while above are two girls dancing the fandango. Another detail of the design suggests the garden of Granada by moonlight, and another little scene depicts a weary traveler on a burro approaching a wayside inn.

Two characteristic designs which express the warmth and richness of oriental life are to be found in the fabrics pictured on still another page. One of these portrays life in Buddhist India. The Taj Mahal is in the center of the design, and before it runs the River Ganges on which native boats drift leisurely. A typical Maharaja, under a jeweled canopy, is being entertained by a dancing girl. Here are to be found the five dancers of the royal festival dance of Siam, and across the river is to be noted a famous Jaganath Temple. Elephants in gorgeous trappings travel toward the great temple, and opposite an intricately carved stone temple gate the fakir is charming two cobras by means of his musical pipe.

Another interesting fabric of oriental design is conceived and executed in the manner of the Japanese wood block artists. The composition and the characteristic brush strokes of the masters of Japanese art have been followed carefully throughout the design, and empaneled signatures of six of Japan's great artists are incorporated as part of the decorative scheme. Fujiyama, as usual, is in evidence and the bamboo, cherry tree, bridge and Japanese ladies have been used to create an unusually interesting fabric design.

It is usual, when a reproduction is made of an old fabric of any period, or when an entirely new design is used, to produce the material in a line of quite a comprehensive variety of colors and color combinations, and this of course adds immensely to the possibilities which any given design may possess for the interior decorator, for these colors and combinations are chosen with reference to their suitability no less than to their practical use.

Mural Decoration by the Late Howard Cushing in Oval Room, House of Mrs. Willard D. Straight, New York
Woodwork of bright canary yellow and mantel of yellow Sienna and white marble. Delano & Aldrich, Architects

LIBRARY IN HOUSE OF A. L. SEARLE, ESQ., MINNEAPOLIS, MINN.

TROWBRIDGE & ACKERMAN, ARCHITECTS

A two-story room finished in butternut with limestone fireplace. Simple plaster walls act as a foil for tapestry which supplies the color note. Window hangings are of crewel work

DINING ROOM IN HOUSE OF MRS. WILLARD D. STRAIGHT, NEW YORK, N. Y.

DELANO & ALDRICH, ARCHITECTS

The sturdy Georgian character of this room is reflected in its entire ensemble. Color is furnished by the silk velour chair coverings and Flemish floral panels in old gilt frames. The crestings on chair backs bear heraldic arms

BUSINESS & FINANCE

C. Stanley Taylor, *Associate Editor*

Have We Reached the Turning Point?

IT is impossible to disguise the fact that at least during the past few months business has been very slow in the offices of most architects. Immediately after the close of the war almost every office was busy, but since the sharp decline in the volume of construction, the on y offices which have been busy are those which specialize in institutional buildings or which may be completing certain large projects begun some time ago.

In the average large office, and probably down to the smaller offices, there are employed today approximately one-third the number of draftsmen who a year or more ago were kept busy. The suddenness with which this change took place may be traced to the same general conditions which caused a rapid price deflation in many industrial and commercial lines.

Prices Breaking Downward

The public, having experienced a sharp break downward in commodity prices, has been eagerly watching the building material and labor markets, expecting a somewhat similar break which might tend to reduce construction costs. The fact that lumber prices have been so materially reduced has done much to encourage this viewpoint and, in a measure, has done a little to encourage construction.

There are, of course, diverging opinions regarding the possibility of a noticeable drop in the cost of other building materials during the next year. A study of relative costs, taken from recent figures in various sections of the country, shows that there has been an approximate decrease in construction costs of 20 per cent from the peak. Manufacturers of various classes of building materials, who have been interviewed in collecting data for this article, claim that any further sizable reduction in prices cannot be expected, at least until labor and transportation costs are decreased materially. There are several conditions which would seem to substantiate these statements.

In the first place it is apparent, by the very nature of the business, that there are not on hand extensive stocks of materials. The production of building material has always been maintained to meet the demand and there have been very few periods of over-production in this field. Consequently, it may readily be seen that this is no time to expect sharp price declines on account of over-production.

Unquestionably, the public is still looking for this decrease in prices. During the month of March a questionnaire was circulated through the pages of *The Builders' Journal* in an endeavor to obtain first hand information from builders and material dealers in various sections of the country. The questions which were asked may thus be briefly outlined:

1. Do you anticipate activity in home and moderate cost building in your locality in 1921?
2. Is it difficult to obtain building loan and mortgage money locally?
3. Is there a dwelling shortage in your locality?
4. If building is "slow,"—why?

Replies to this questionnaire were received from every section of the country, and these answers probably represent the consensus of opinion:

1. Some building activity expected, but definite activity seems certain by the fall of 1921.
2. Less difficult to obtain mortgage money now than it has been.
3. There is a very definite dwelling shortage in most localities.
4. Local building is "slow" because the public is still waiting for a further decrease in material and labor costs. There is every reason for labor to accede to wage reductions. There is a decided increase in the efficiency of building labor and a noticeable return to the building industries of workmen who have been engaged during previous years in other work.

For further substantiation of this condition we may turn to the interesting nation-wide survey just made by The Fidelity and Deposit Company of Maryland. This is the second survey of this nature which has been made by this large financial institution, and from it we have selected certain points which are of direct interest in connection with the building activity:

1. There have been appreciable wage reductions in the building industry in these sections of the country:

New York district,	South Atlantic district,
Pennsylvania district,	East-South Central district,
Ohio district,	West-South Central district,
Indiana, Michigan, Wisconsin and West-North Central district,	Western Mountain district,
	Pacific district.

It may be noted that these reductions have been

largely forced through by building trades employers.

2. The productivity of labor per man in all industry has increased since last September in every section of the country.
3. (*a*) There is need for building construction in the low priced dwelling class in every section of the country.
   (*b*) A demand exists for high grade dwelling and apartment buildings in all but the South Central and Western Mountain districts.
   (*c*) Factories and warehouses are needed in New England.
   (*d*) For office and store buildings there is strong demand on the Pacific Coast.
4. Sentiment is not favorable toward building operations, at present costs, in any section of the country.
5. Savings accounts have increased throughout the Northeastern and North Central states and in California. In other sections of the country, particularly throughout the South, the total of savings has decreased.
6. This survey shows no noticeable movement of men back to the farms from industries, which would indicate the existence of a continued pressure of the housing shortage.
7. The chief local questions in practically every community seem to be taxation and housing shortage. The principal national questions, as reported from each section, are taxation, tariff and peace settlement.

This survey has been analyzed by the Hon. David F. Houston, from whom we quote: "The country has successfully borne the strain caused by a most notable drop in prices, particularly of a vast volume of raw materials, and has weathered a trying period of liquidation. The demand for finished products has not developed to the point where our factories feel justified in taking the requisite quantity of our surplus raw materials to furnish the necessary relief to their producers; but there are some indications of a change in this direction. Business men realize that forced action, based on artificial optimism, may lead to unfortunate results and produce further embarrassment. The foreign situation has not shown the expected improvement, and continued difficulties are experienced in discovering effective European markets for our commodities.

"Certain favorable conditions are indicated in this survey. The cost of living has appreciably diminished. *Building operations in a number of districts tend to increase in number.* There have recently been no strikes of consequence and greater productivity of labor per man is reported from all districts. Raw materials are plentiful, and physical transportation conditions are good. There have been no business failures of any importance. The crop outlook is satisfactory and the banking situation has improved. It is believed that confidence in business circles is slowly spreading, and that while there is hesitancy the business men of the country are feeling their way with sound business caution, and the country is working back toward a more stable condition."

The present high cost of freight transportation seriously affects building costs, in that it is applied from the time the material in raw form is shipped to the factory, until it reaches its final destination at the building. When we add to this the disturbed condition of the labor market in the building field, we have a situation which, though it may be plain to those who take a professional or service interest in construction, is not readily understood by the building public.

We understand from unofficial sources that this question of railroad rates—both for passenger service and freight transportation—is to be taken up seriously when congress convenes again, and that a reduction in rates throughout may certainly be expected. This condition cannot but reflect beneficially upon the building industry, and if it proves to be sufficiently drastic must favorably affect building material costs. We may note here, however, that a reduction of prices by manufacturers will not be immediately felt, as it will be necessary for dealers to get rid of any stocks which may be on hand before this price reduction enters definitely into the retail field. The survey referred to shows that sharp reductions in wholesale prices of commodities have not yet been entirely reflected through similar reductions in retail prices.

The Question of Building Labor

It is apparent that labor in the building field is in a state of unrest, which might well be expected when the temporarily suspended law of supply and demand begins to function, feebly at first but with increased strength, as labor decentralizes from other industries which have drawn it away from the building field.

A brief analysis of this condition shows that many good mechanics of the building trades are coming back from the automobile plants and the war industries, seeking again the work for which they were originally trained. Viewing broadly the proposition of labor in the building industry, it is questionable whether any law except the economic law of supply and demand will ever govern labor costs for an extended period. The power of labor unions is naturally greatest at the peak of demand, and weakest in the valleys of building inactivity.

We hold here no brief against union labor, but owing to the unfair application of the principles of unionism, as affecting the building industry during the past five years, we are thoroughly committed in our own minds to the open shop policy or to a re-establishment of the functioning and requirements of labor unions in this industry which will recognize the difference in the productive value of individuals—in other words, taking off the limitation of production so that every laborer shall be worthy of his hire, and in turn shall receive proper value for his services.

In the foregoing paragraphs we have endeavored to make clear some of the fundamental economic conditions which bear upon the building situation today. It would seem that a number of these perplexing problems are reaching a point where it will be possible to offer logical and practical solutions. It is certain that conditions are not getting worse, nor are we yet in a definitely quiet period. Having recently visited the offices of many architects in the East and Middle West, we find indications of increased business where, during the past few months, there has been no interest on the part of clients, but where now architects are reporting inquiries and, in some cases, definite increase in the volume of work.

So it would seem that the first phase of returning building activity is now opening up—that is, the period when prospective builders realize that there is not much to gain by waiting, and those who are in immediate need of buildings of various types are now proceeding seriously to the business of planning and construction. There is naturally a great interest in new houses, but a still more definite interest is to be noted in the provision of schools, hospitals, and other institutional buildings, a condition to be expected at this time.

Out of the maze of conflicting opinions there may be gained these definite impressions:

1. That the year 1921 will show approximately an average volume of building construction.
2. That money spent in this field will be principally for buildings of the habitation class.
3. That there will be further progress toward settlement of the labor question, and some additional reduction of material prices which will make the year 1922 an opening year of sound activity in building construction.
4. That this period of activity, when it does open up, will continue steadily for at least five years.

It must be realized, of course, that this is only an expression of opinion, but as it is a reflection of the best professional and public opinion it seems to be about the most valuable forecast available at this time.

It is certain that there will be during the next year more recognition on the part of the federal government of the problems and needs of the building industry, which has definitely suffered under the past administration. The country has apparently passed the worst of its period of business depression, and part of the program of reconstruction being necessarily a program of building to meet building shortages, all evidence is favorable to the interests of those engaged in any branch of the building construction industry.

A Country House Near Apeldoorn, Holland
A. H. Wegerif, Architect

Results from Tax-Exemption

A RECENT New York ordinance exempting from taxation, entirely or in part, all residential construction done during a period of two years, has already shown definite results in stimulating building activity. This is probably the most practical measure toward this end that has as yet been put into effect in the United States. It is evident, therefore, that this question of tax-exemption should be given serious consideration in every city and community where shortage exists.

Briefly, this ordinance, which is retroactive and covers a period from April, 1920 to April, 1922, exempts from real estate taxation for a period of ten years $5,000 of the appraised valuation on any individual dwelling, and $1,000 a room up to five rooms on each apartment of multi-family dwellings. In other words, on a dwelling with land that is appraised for taxation at $8,000, taxes are to be paid only on the balance of $3,000. The present New York tax rate being $2.85, it may be seen that this ordinance saves, per family housed, approximately $142.50 a year, or $1,425 in ten years. This is an actual saving which is negotiable from a real estate viewpoint. On a two-family house the saving would be twice as much, and similarly in buildings containing more apartments the saving would increase, in accordance with the terms of the ordinance.

While this ordinance has been in effect only a few weeks there are already in evidence a number of interesting results. It may be noted first that activity in the sale of improved realty has increased, a number of recently constructed apartment houses having already been sold under the new cost-saving conditions created by this ordinance. Brokers in outlying districts of the city, where land values are low, report a greatly increased interest in purchase of vacant property for building purposes. Naturally the effect of this exemption will be most beneficial to the inexpensive type of houses where relative proportion of exemption to total appraised value is high. Thus on a dwelling in the high land value districts, where the lot might be appraised for $15,000 and the building for an equal amount, the exemption would represent only $5,000 on a $30,000 appraised value, or a tax-exemption of approximately 17%. In the outlying residential districts, where a $15,000 house might be built on a lot worth $3,000, the tax-exemption would be approximately 30%. Similarly, in the low cost district a house costing $7,000 might be erected on land worth $1,500 and the appraised valuation here, based on present appraisal methods, would probably be about $5,000, which would make this house exempt from taxes for a period of ten years.

The result of this condition is already reflected in architects' offices, particularly in Brooklyn and other districts where land values are not high. Several speculative housing operations which have been in abeyance are now proceeding.

Walter Stabler, Comptroller of the Metropolitan Life Insurance Company, at a recent meeting of the Board of Estimate of New York reported that since the passage of the tax-exemption ordinance this company had loaned over $2,000,000 to builders of five-story apartments of the walk-up type, and that he considers the ordinance responsible for a great deal of building activity.

It is interesting to note that the definite effect of this ordinance is being felt exactly where the housing shortage is greatest, that is, in the districts available for the construction of moderate cost dwellings and apartment houses. Evidently in the outlying sections of other cities of the United States, and in small cities and towns where the housing shortage is acute, a tax-exemption measure would go far toward encouraging home building.

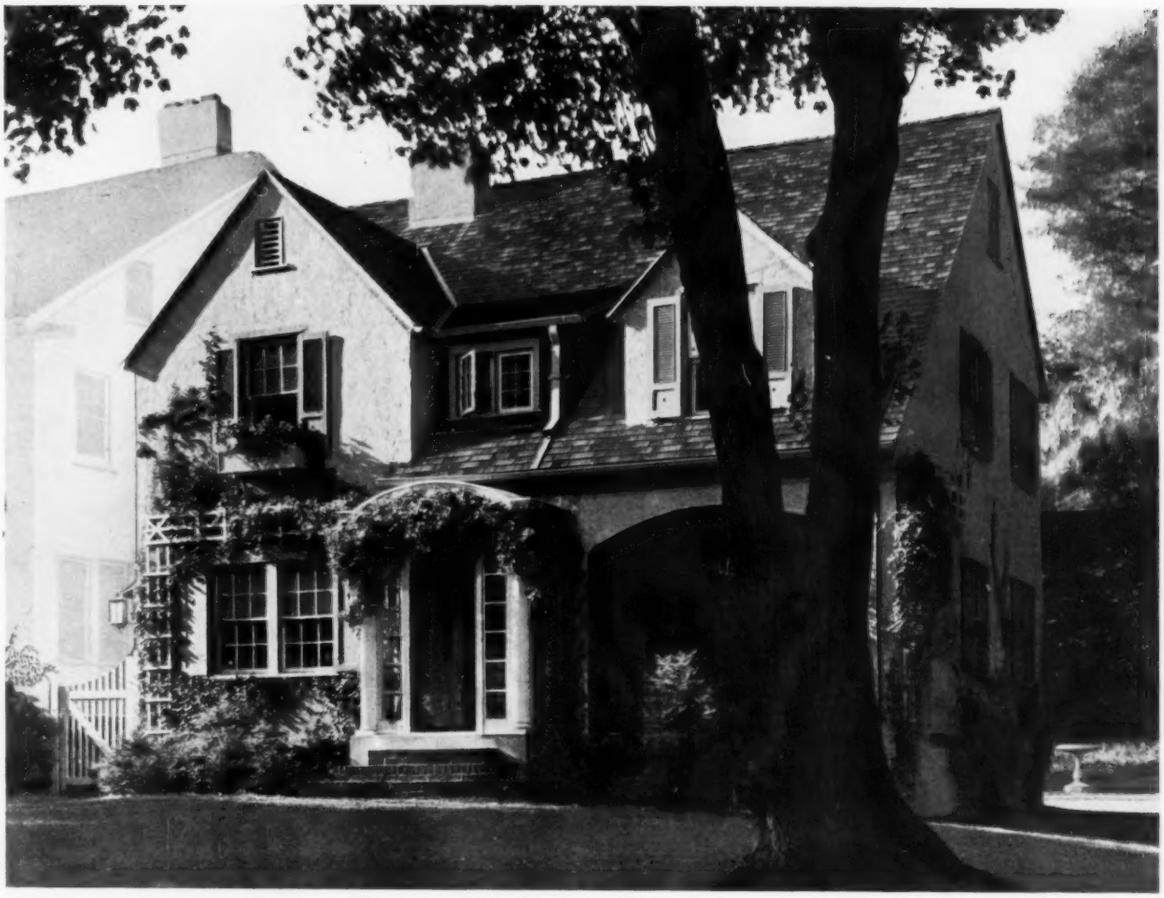
Many of the savings banks and other loaning institutions which have been approached for mortgage money have been willing to loan, but restrict their appraisals to the pre-war building valuations. This is because they have been afraid of shrinkage in the replacement costs of buildings. This tax-exemption measure, which has the effect of actually reducing the cost of construction by amortizing $1,400 per family back to the purchaser over a period of ten years, naturally reduces this much of the potential shrinkage in value, and should influence the mortgage market toward a more liberal appraisal and toward the encouragement of building by increasing the local volume of money available for building and for permanent loans on structures for dwellings.

Builders, architects, real estate operators and others interested in stimulating local activity should, therefore, give serious consideration to this important action in New York, and realizing its results should make a definite effort to bring about some form of tax-exemption elsewhere. It is true that strong opposition has been brought to bear on this measure and that several arguments have been advanced, some being in the interests of property owners who are not in the exemption class—in other words, those who own buildings constructed before the tax-exemption period.

From the viewpoint of the municipality there is nothing to lose and much to gain by limited tax-exemption of this type. Practically all dwellings constructed because of an inducement of this nature will pay taxes on the amount of appraisal in excess of the exemption, and there will also be an increment in the value of land in districts in which these houses are constructed which will reflect favorably on the income of the city because of an increase in taxable values. But more important than this is the fact that through this means the housing shortage may be somewhat relieved and considerable sound activity developed in the building material and building labor markets.

A Small House at Yonkers, N. Y.

ARNO KOLBE, ARCHITECT AND OWNER



First Floor Plan

Second Floor Plan

EDITORIAL COMMENT

CALDER COMMITTEE REPORT

THE results of the hearings and investigations, conducted over a period of many months in different sections of the country, by the United States Senate Committee on Reconstruction and Production is now made available to the public. The Committee, owing to its government appointment, had the opportunity of digging deeply into the many conditions that have operated to retard construction, particularly the building of homes, on which the Committee's work was chiefly centered.

Houses will not be built in any appreciable numbers until the public has become satisfied that material prices and wage rates have reached a reasonable basis and that investment will not be jeopardized by falling realty values. This is the chief obstacle to construction, and it will not be removed by investigations, conferences or government fiat. Aside from this there are, of course, a number of influences at work that have served to make construction difficult, even granted that its cost was not the deterrent factor.

Chief among the conditions which have been found to work to the disadvantage of building is the question of credit. On this the report says: "The history of the past two years shows that enterprises producing luxuries and consumable goods have promised greater profit than have enterprises providing housing, transportation or the development of national resources.

"Loans have been available to make possible the hoarding and maintenance of high prices of sugar, cotton, wool, hides, foodstuffs, etc., and this has resulted in maintaining the cost of living at an artificial level in defiance of the law of supply and demand. . . . The paradox has been that money has not been loaned for building because the cost of building has been too high but money which has been loaned for trading in commodities has so increased the cost of living that the cost of building has increased."

The other recommendations deal chiefly with matters of taxation and would react only slightly on new construction, with the exception of the provision for the exemption from taxation on interest of mortgage loans not exceeding $40,000 when such loans are held by individuals.

The sum total of the Committee's efforts, if enacted into legislation will, it is seen, help but little in supplying the houses that are so badly needed. They will tend, of course, to reduce the cost of financing and other promotion expenses, but these items are but a small part of the cost of construction and the major items—materials, transportation, wages and efficiency of labor—must remain to be worked out in accordance with the law of supply and demand.

This is rapidly taking place and is already showing its effect in growing construction activity. To quote from the report,—"When the commodity index figure of wholesale prices of building materials approximates that of general commodities, there can be little reason to fear loss in investment in building through future lower replacement values, and because of the accumulated demand for structures of all sorts, building materials will be safe if they reach such a level in the near future."

Following the release of restrictions by the government on material costs, the wholesale index figure reached the point of 256 in November, 1919 as compared with 100, the base in 1914. This rise was, however, more gradual than that of general commodities because they had already reached the point of 207 in November, 1918. May, 1920 saw both reach their maximum level, building materials being 341 and general commodities 272. At the end of January, 1921 building materials stood at 239 and general commodities at 177.

The divergence between the figures is, therefore, constantly growing less and with the rapid fall of the last several months, which has probably not been recorded in any other similar period of economic history, building materials may very soon be expected to reach a level which will provide a stabilized basis for the resumption of construction of all kinds.

THE MISPLACED KEYSTONE*

By Ernest O. Bostrom, Architect

Inspired by the cartoonist's conception of where the A. I. A. belongs in the building industry as illustrated in The Architectural Forum of February, 1921.

ONE fell glance—
Just by chance,
Made me want to hop and prance.

Made me mad—
Same time sad,
To think that it could be so bad.

Didn't you see—
What the key
Of the arch was now to be?

Can't you wake?—
Must I shake?
Must the very arch stones quake?

We must think—
Not just blink,
And not only splatter ink.

We must act—
That's a fact!
With all wisdom, speed and tact.

Public thought—
Can't be bought,
Should be moulded as it ought.

Off we must—
Shake the dust,
Ere the very brain cells rust.

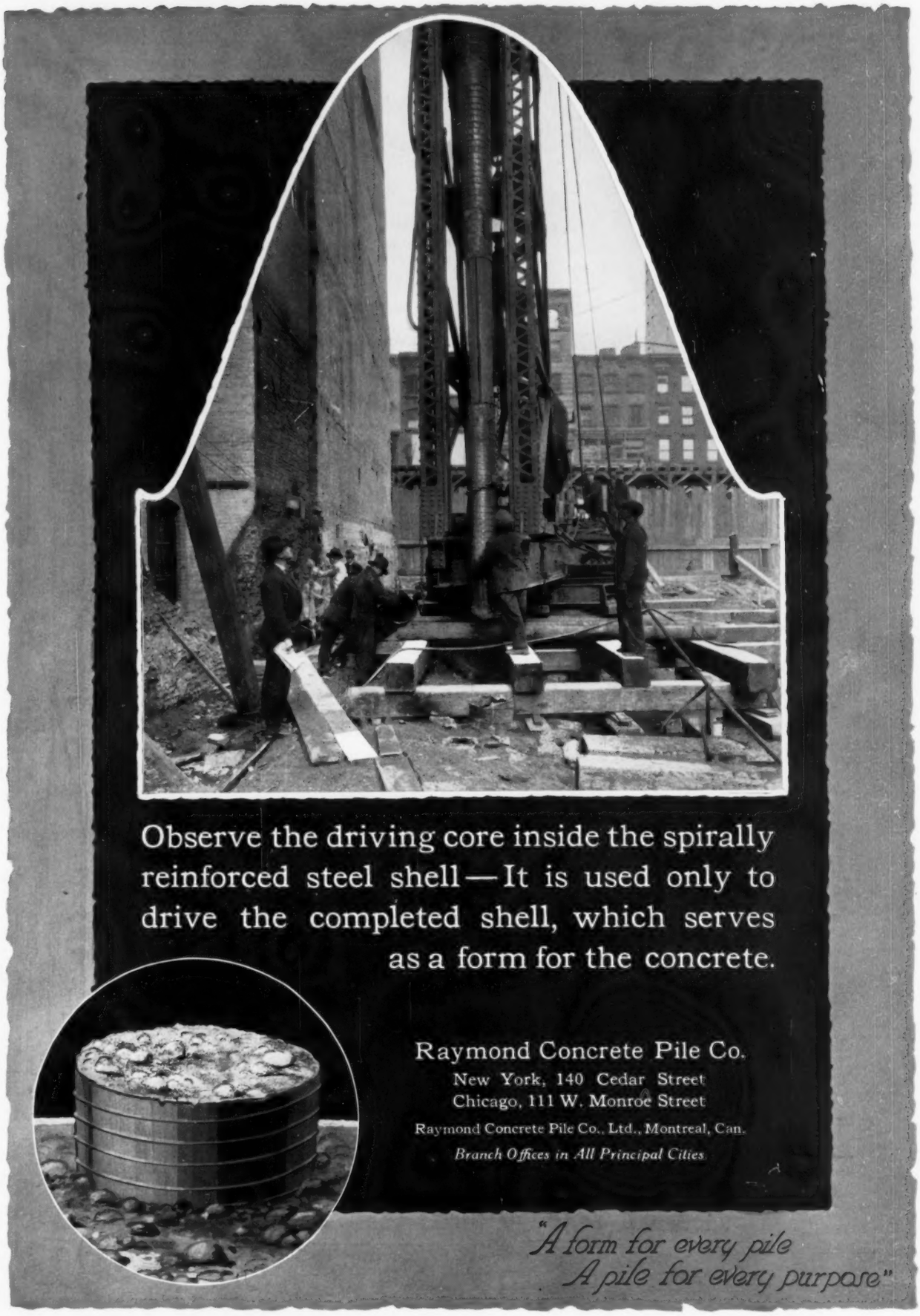
Am I right?—
Then let's fight,
That which we believe a slight.

Who will stay?
Join the fray!
It will be a battle gay.

Be not slow—
We will show
Where the key should *really* go.

And its name—
Borne by Fame,
Shall be classed with Art again.

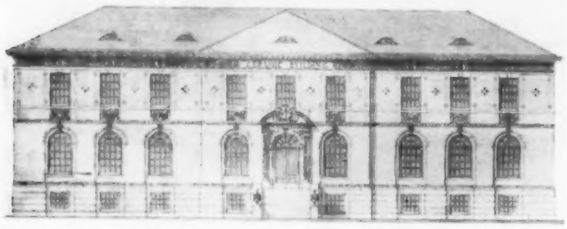
*This poem, as printed, is much abbreviated from the original.


Observe the driving core inside the spirally reinforced steel shell—It is used only to drive the completed shell, which serves as a form for the concrete.
Raymond Concrete Pile Co.
New York, 140 Cedar Street
Chicago, 111 W. Monroe Street
Raymond Concrete Pile Co., Ltd., Montreal, Can.
Branch Offices in All Principal Cities
"A form for every pile
A pile for every purpose"

Manufacturers' Catalogs and Business Announcements

PRIZE DESIGNS ON CERAMIC BUILDING

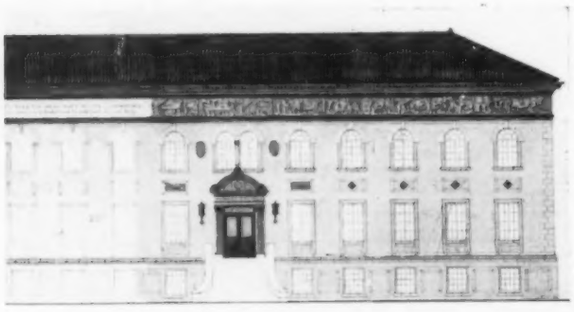
THE New Jersey legislature has voted to Rutgers College, New Brunswick, N. J., an appropriation of $100,000 for the erection of a building for the future School of Ceramics. The manufacturers of ceramics, particularly the makers of terra cotta, are interested in having the facade of the building show the development and merit of their product. For this purpose they offered two



First Prize Design
Submitted by E. W. Moell

prizes for the best designs submitted of a brick facade with terra cotta trimmings, the plans for the building having been prepared by the State Architect, F. H. Bent.

A committee consisting of the State Architect, G. H. Brown, Abel Hansen, J. W. Mettler, E. V. Eskesen and the late Oswald Speir, received four-



Second Prize Design
Submitted by S. R. Audsley

teen designs, all of which gave every indication of conscientious work and painstaking study. The first prize of $200 was awarded to E. W. Moell, Rocky Hill, N. J., and the second, of $100, to S. R. Audsley, Perth Amboy, N. J.

Advice on Acoustics

GEORGE C. HANNAM

Acoustical Engineer

1400 Broadway - - New York, N. Y.

ANNOUNCEMENTS

Mr. Harold Macklin, architect, announces the removal of his business to Winston-Salem, N. C., with offices at 311-313 Wachovia Bank Bldg. Manufacturers' samples and catalogs requested.

Messrs. William Crutchfield II, Wilson A. Gosnell and Gordon L. Smith have formed a partnership for the practice of architeeture under the name of Crutchfield-Gosnell-Smith, Associate Architects, with offices at 1239-41 Volunteer Bldg., Chattanooga, Tenn.

J. G. Legel & Co. have opened an office for the practice of architecture at 511 Wilson Bldg., Clinton, Iowa. Manufacturers' catalogs and samples desired.

BOOK NOTE

LANDSCAPE ARCHITECTURE: A classification scheme for books, plans and other collected material, by Vincent Hubbard, Assistant Professor of Landscape Architecture at Harvard University and Theodora Kimball, Librarian at the School of Landscape Architecture at Harvard University. 132 pp., bound in paper.

ONCE a collection of material on any given subject is begun there arises immediately the need for some definite scheme for its filing and classification. This book provides a satisfactory guide for its particular subject. It is the first published comprehensive classification of the field of landscape architecture, and is based on a system which has been developed in the Library of the School of Landscape Architecture at Harvard University. It provides for the arrangement of all manner of data, whether from published sources or from photographs and plans or from miscellaneous notes and references. It parallels, in its general scheme, the city planning classification previously published by the Harvard University Press.

Aside from its direct application in landscape architecture it should be full of suggestion to architects in formulating a scheme for classifying and filing individual collections of material relating to architecture.

ANNOUNCEMENT OF SUMMER COURSES

THE Department of Architecture at the Massachusetts Institute of Technology is glad to state that the following courses will be given this summer at the Rogers Building in Boston; namely, Shades and Shadows, Perspective, Office Practice, Elementary and Intermediate Design, Elementary and Advanced Constructive Design, and Structural Design. Any of these courses if satisfactorily passed may be substituted for corresponding winter work.

Detailed information concerning these courses can be procured by application to Professor William Emerson, 491 Boylston St., Boston, Mass.